

9/25/2006

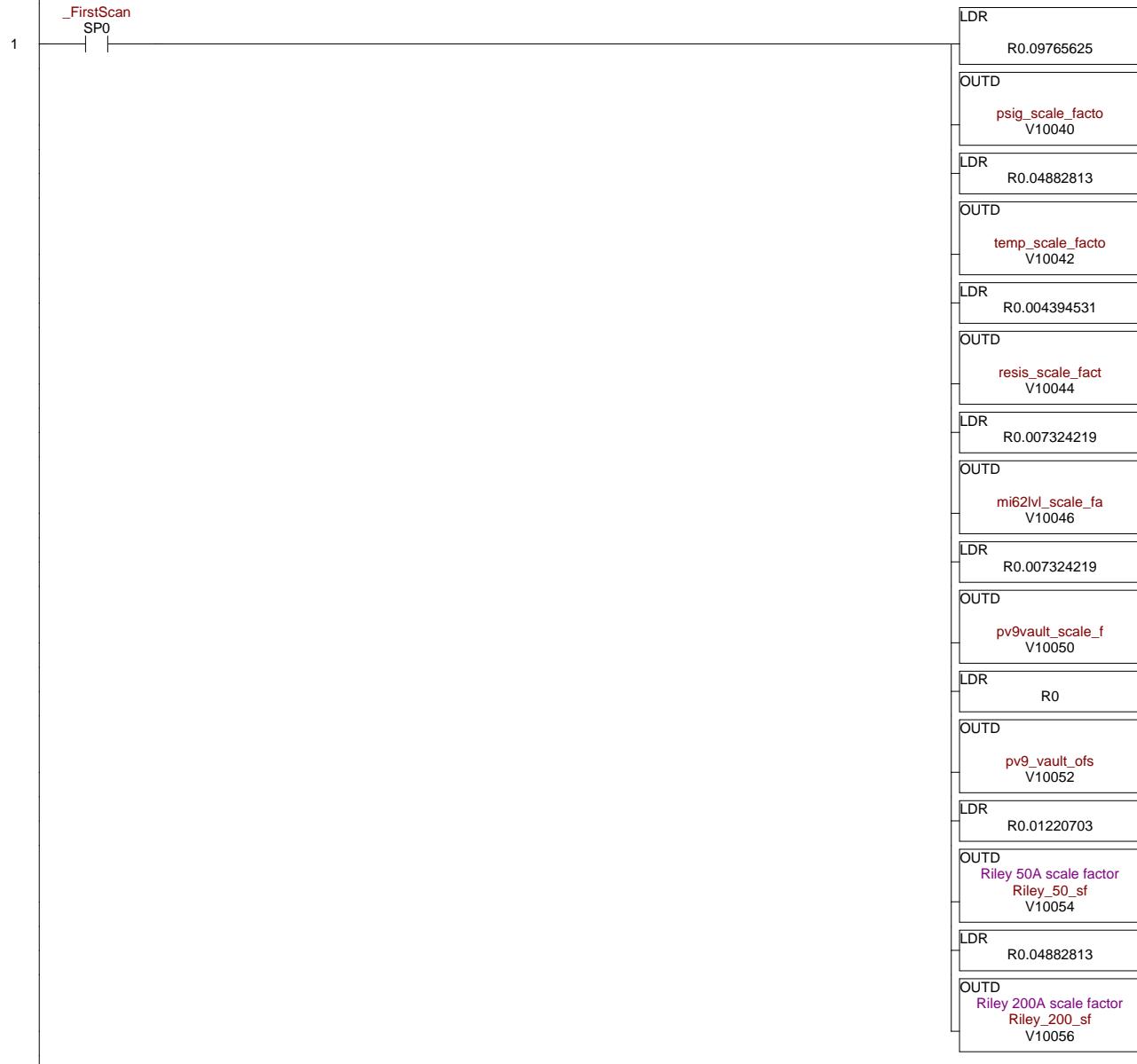
450

mi62lcw

Path: c:\pak\numi\mi62\mi62lcw.prj
Save Date: 09/25/06 08:29:38
Creation Date: 03/03/06 16:31:31
PLC Type: 450
Class ID: DirectLogic 405 Series
Link Name: MI62LCW
Description: MI-62 LCW PLC
Version: Issue O
Company: Fermi National Accelerator Laboratory, Batavia, IL
Department: Accelerator Control / Systems Hardware Group
Programmer: Paul Kasley x8658

Initialization Tasks:

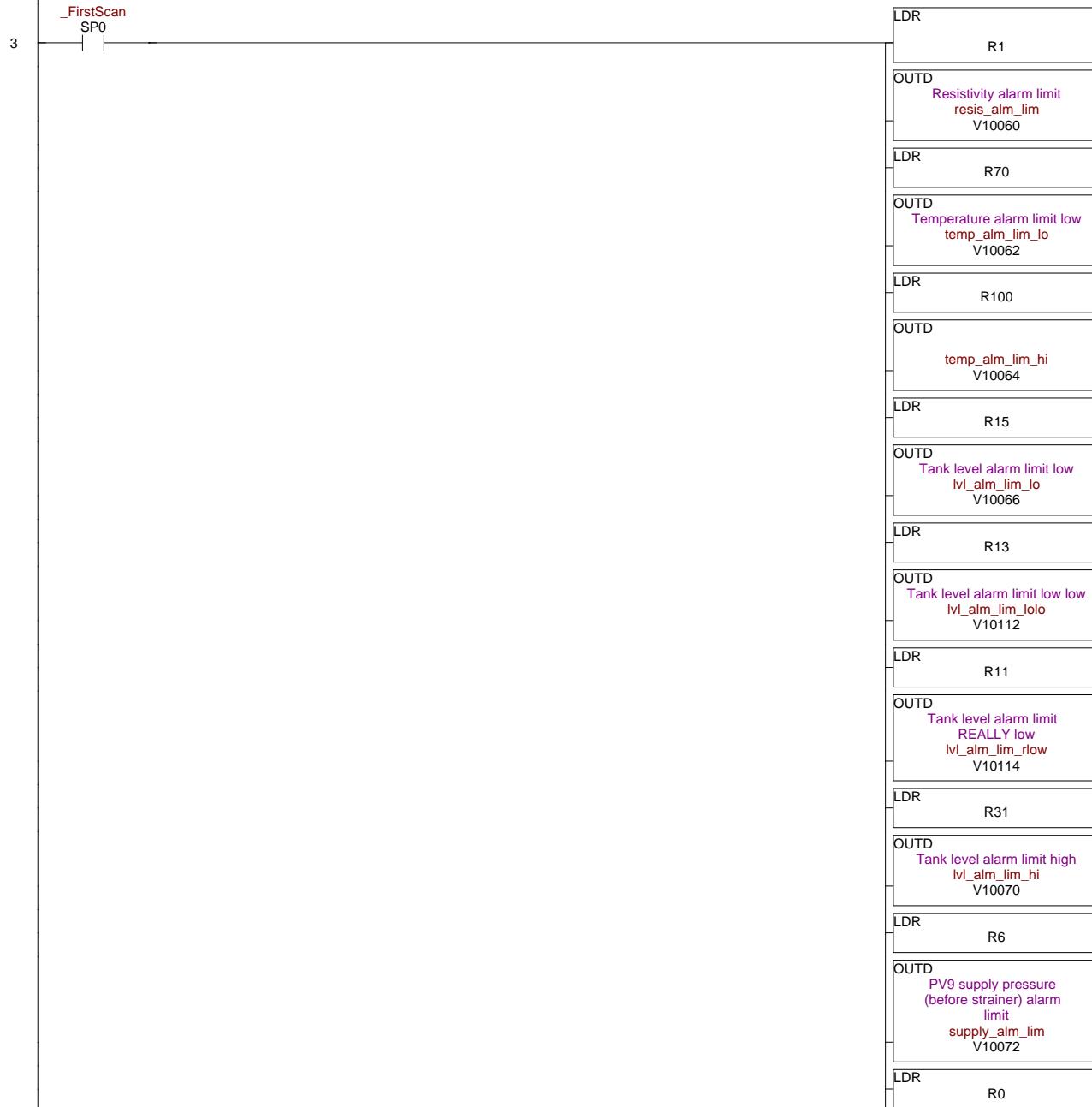
- A. Set up transmitter scale factors
1. Set up pressure transducer scale factor = 400/4096
 2. Set up temperature transducer scale factor = 200/4096
 3. Set up resistivity meter scale factor = 18/4096
 4. Set up MI62 tank level scale factor = 30/4096
 5. Set up pump vault suction pressure scale factor = 30/4096
 6. Set up pump vault suction pressure offset = 0 psIA
 7. Set up pond motor current sensor scale factor = 50/4096
 8. Set up LCW motor current sensor scale factor = 300/4096
 9. Set up temperature transducer offset = -40 deg
 10. Set up mixing valve conversion factor = 100/4096



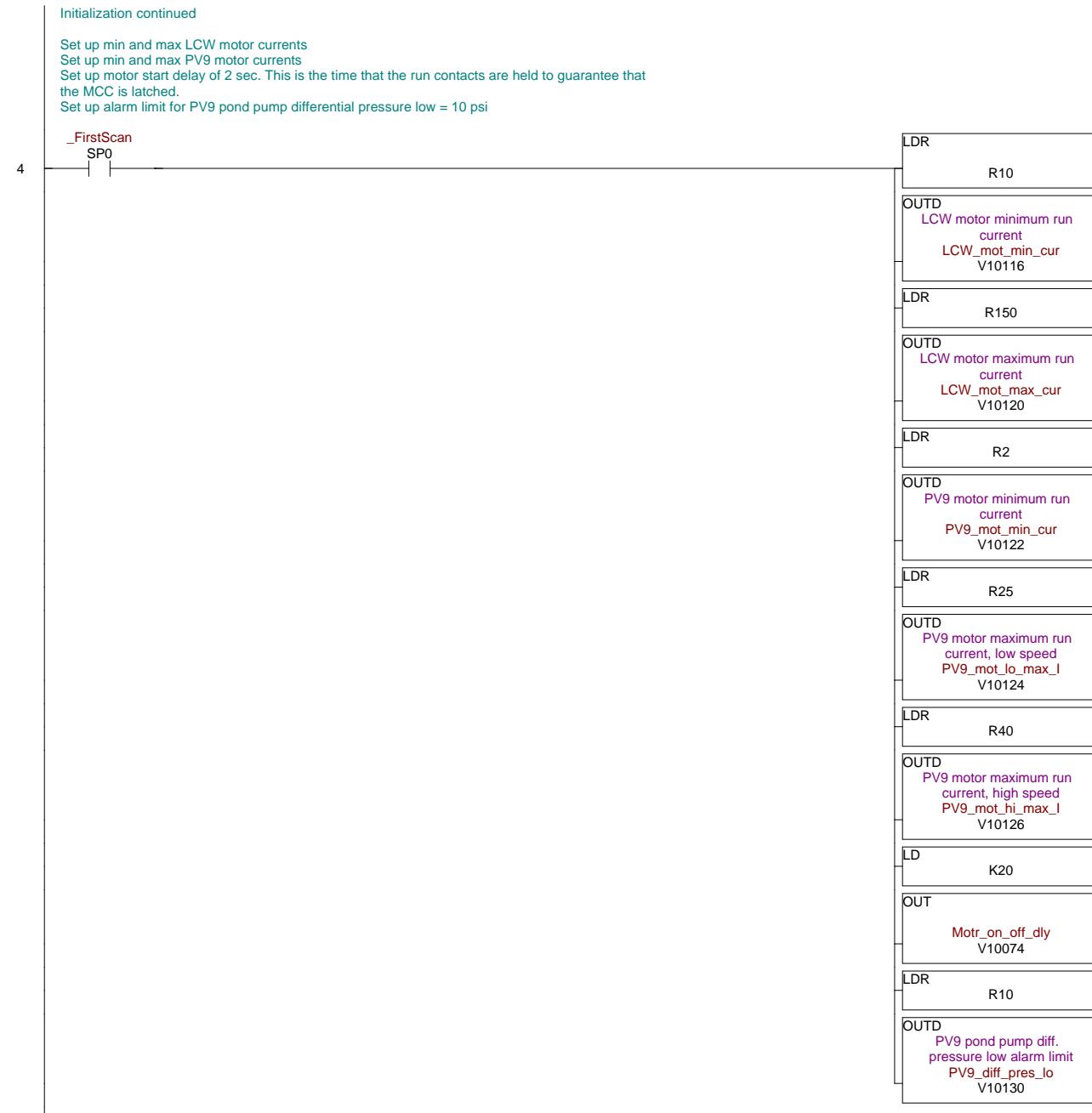


Initialization Tasks (contd)

- B. Set up alarm and permit limits
1. Resistivity meter alarm limit = 1 meg
 2. LCW supply temp alarm low = 70 deg
 3. LCW supply temp alarm high = 100 deg
 4. LCW expansion tank level alarm low = 10 in
 5. LCW expansion tank level alarm high = 26 in
 6. PV9 Pond supply pressure (before strainer) alarm limit = 6 psig
 7. PV9 Pond supply pressure (before strainer) integration time = 15 sec
 8. PV9 Pond supply pressure (after strainer) alarm limit = 0 psig
 9. PV9 strainer differential pressure high alarm limit = 3 psi
 10. LCW expansion tank air pressure low alarm limit = 5 psig
 11. LCW run inhibit temperature high trip = 120F. Also used in PS permit.
 12. LCW run inhibit temperature low trip = 60F
 13. Alarm integration time = 15 sec
 14. LCW motor shutdown integration time = 15 min = 900 sec (LCW temp out-of-range)
 15. LCW expansion tank level alarm low low = 8 in. Also used in PS permit.
 16. LCW expansion tank level alarm REALLY low = 6 in. Also used as trip for LCW motor shdn.



OUTD	PV9 supply pressure (after strainer) alarm limit pv9_sup_alm_lim V10076
LDR	R3
OUTD	PV9 strainer differential pressure alarm limit hi pv9_diff_alm_hi V10100
LDR	R5
OUTD	LCW expansion tank air pressure low alarm limit Air_press_lo_lim V10102
LDR	R120
OUTD	LCW water temp shutdown, hi trip Shdwn_temp_hi V10104
LDR	R60
OUTD	LCW water temp shutdown, lo trip Shdwn_temp_lo V10106
LD	K150
OUT	General alarm integration time Gen_alm_dly V10110
LD	K9000
OUT	LCW Motor Shutdown Integration Time LCW_shdwn_dly V10111



Set up trip points for LCW motor overtemps.

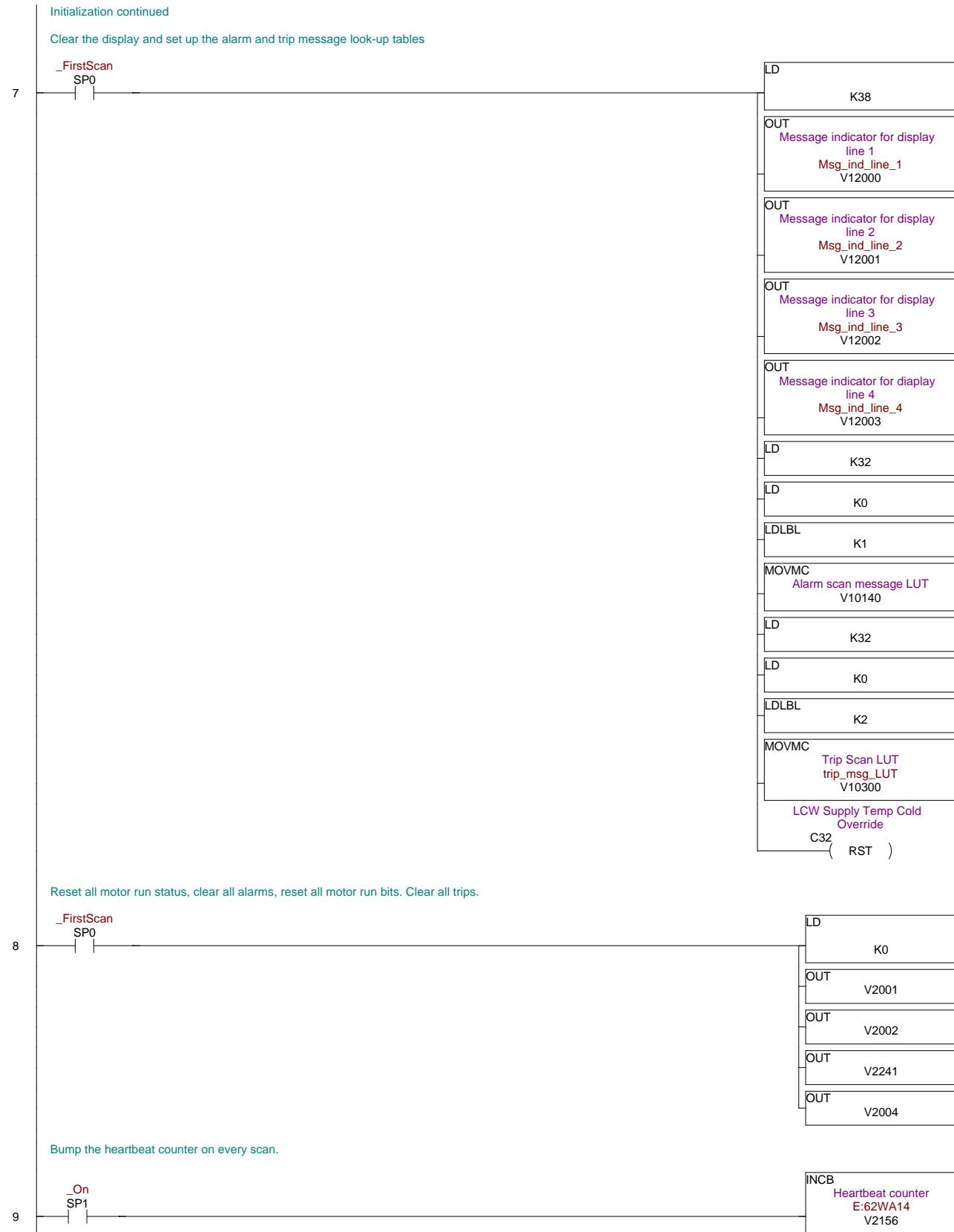
The thermistors are in series with a 1.00K 1% resistor to the 24V field supply. As the motors get hot, the thermistor resistance increases and the loop current drops. When the current drops below the trip point, the motor is shut down.

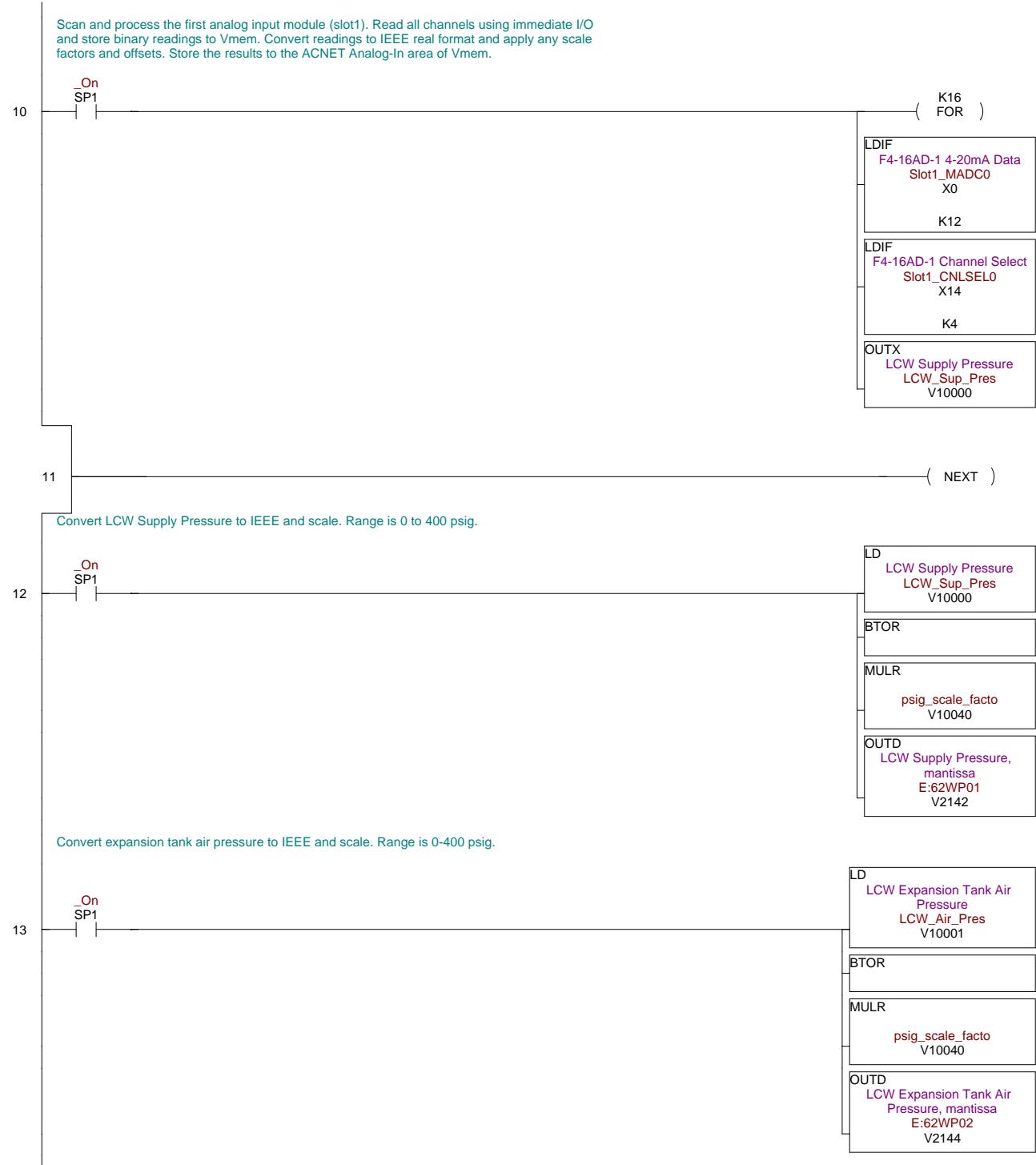
Hysteresis is introduced by dropping the trip point once an overtemp is detected. The trip point is moved up when the thermistor current drops below the lower value.

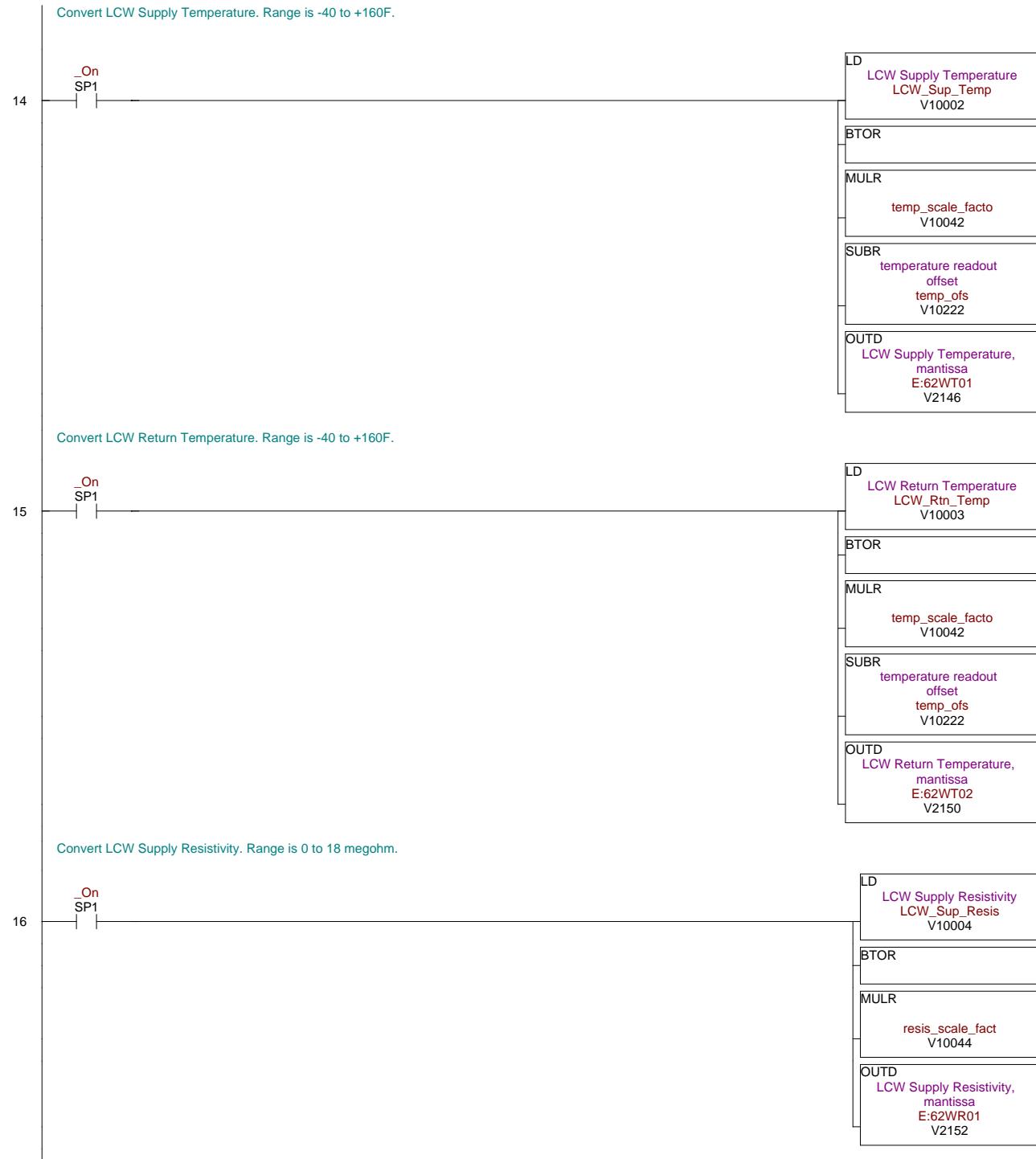


Set up the motor overtemp trip points for each LCW motor





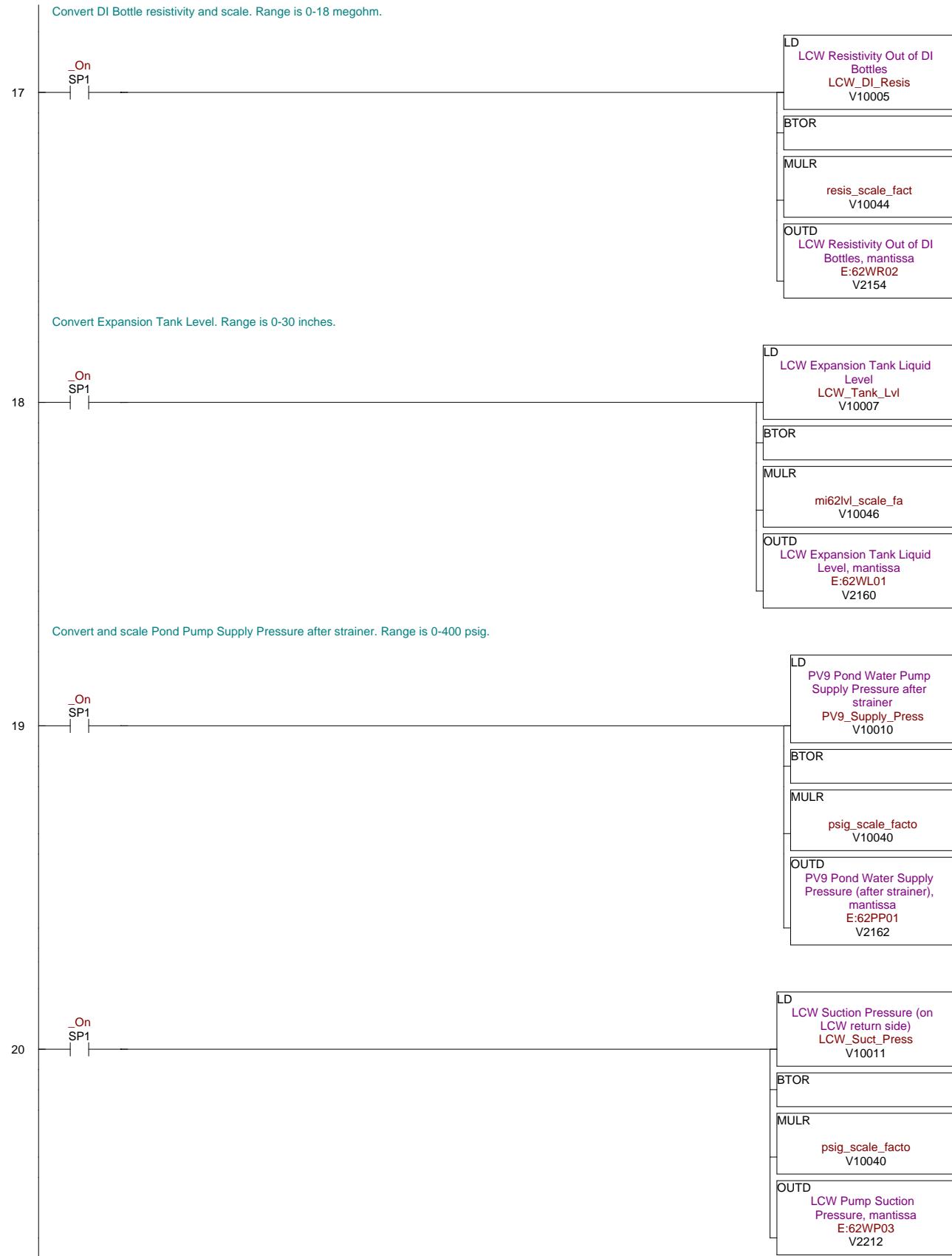


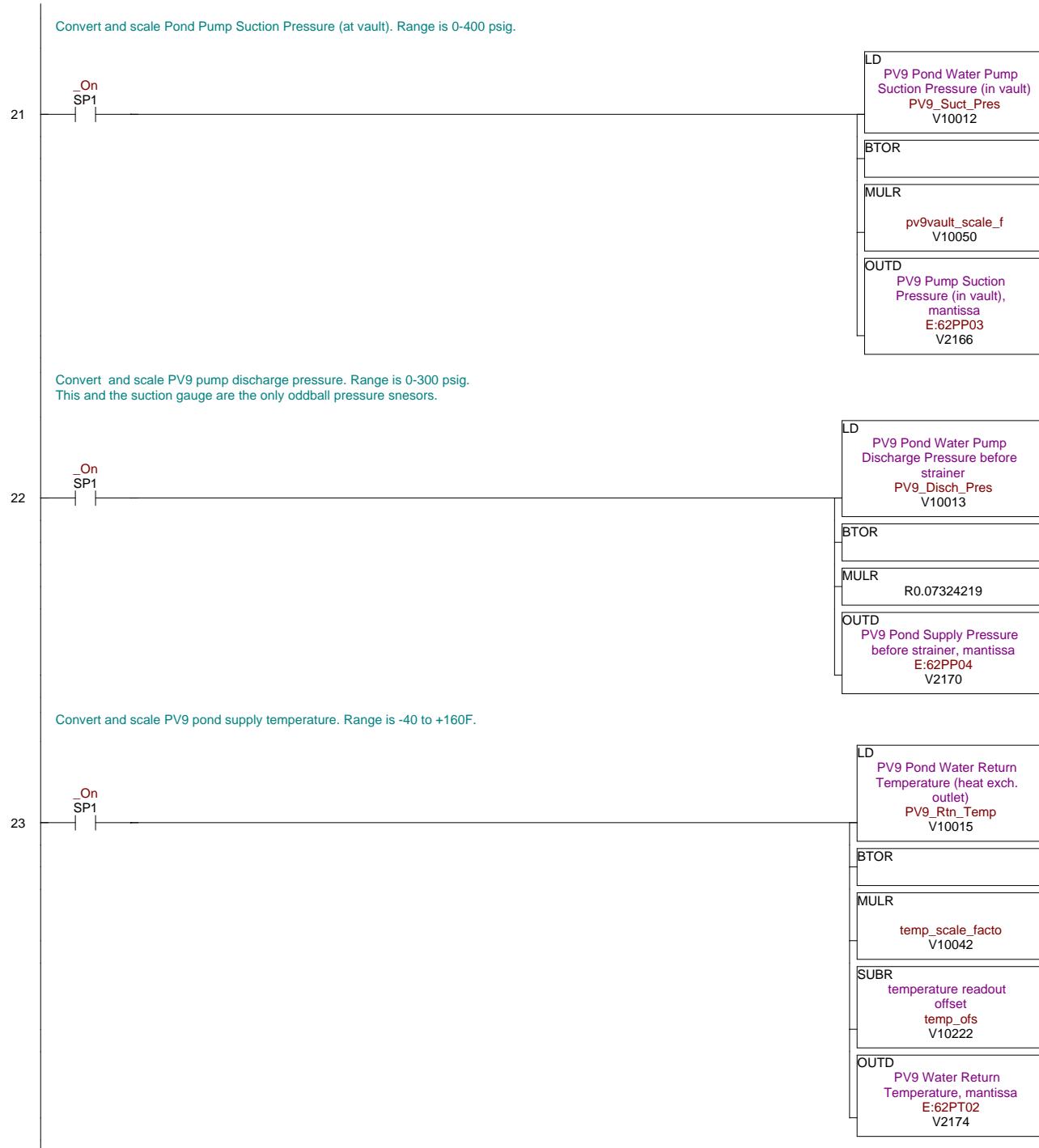


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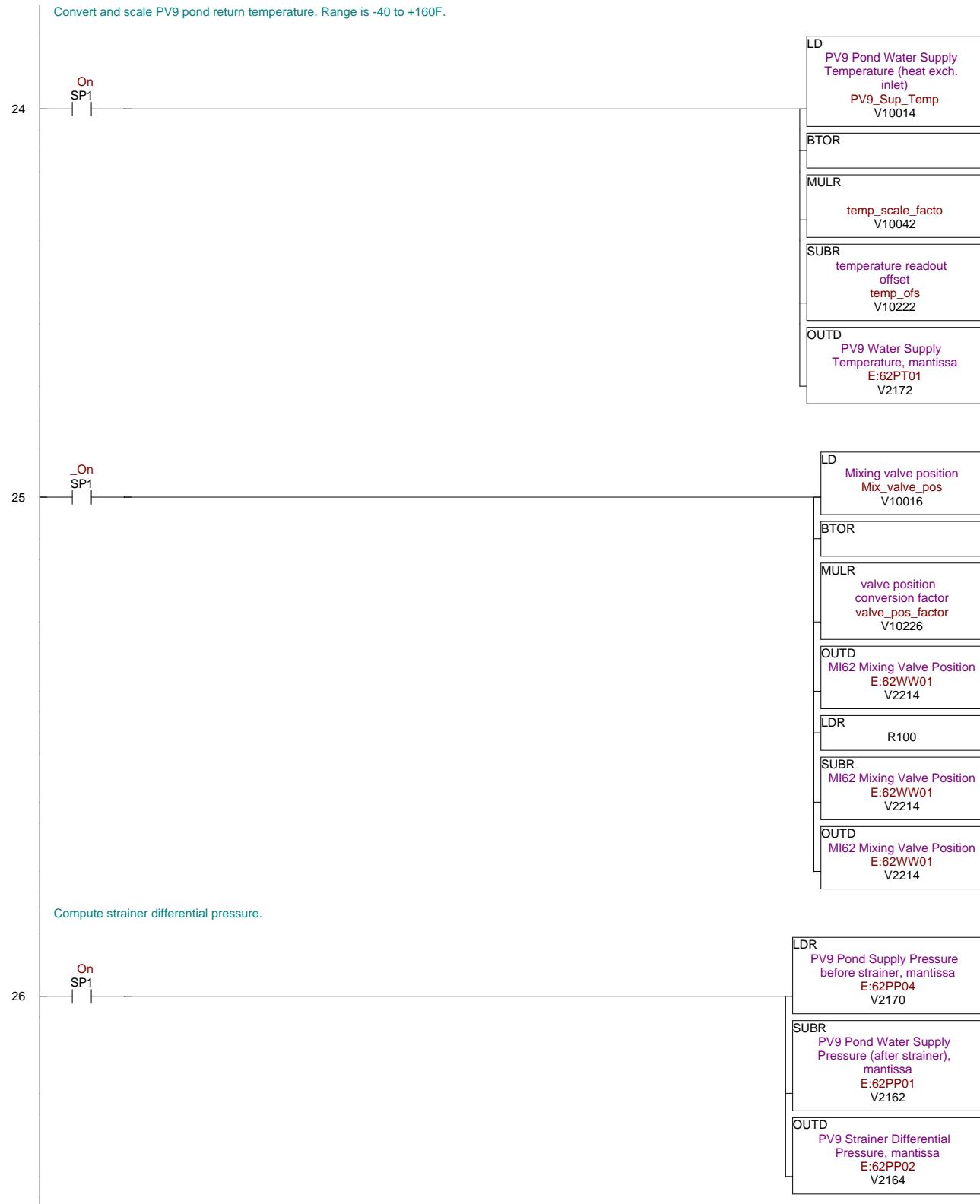


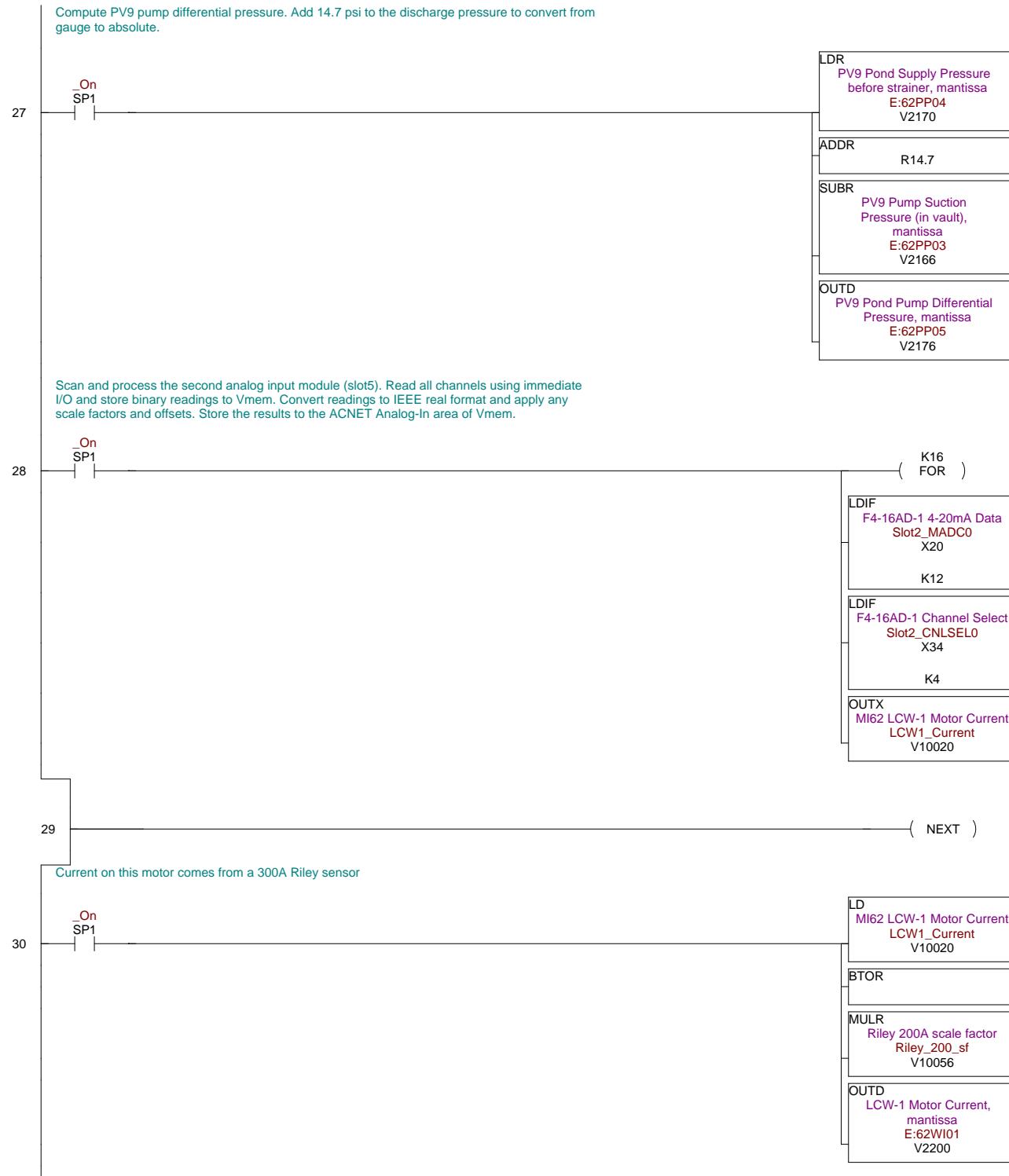


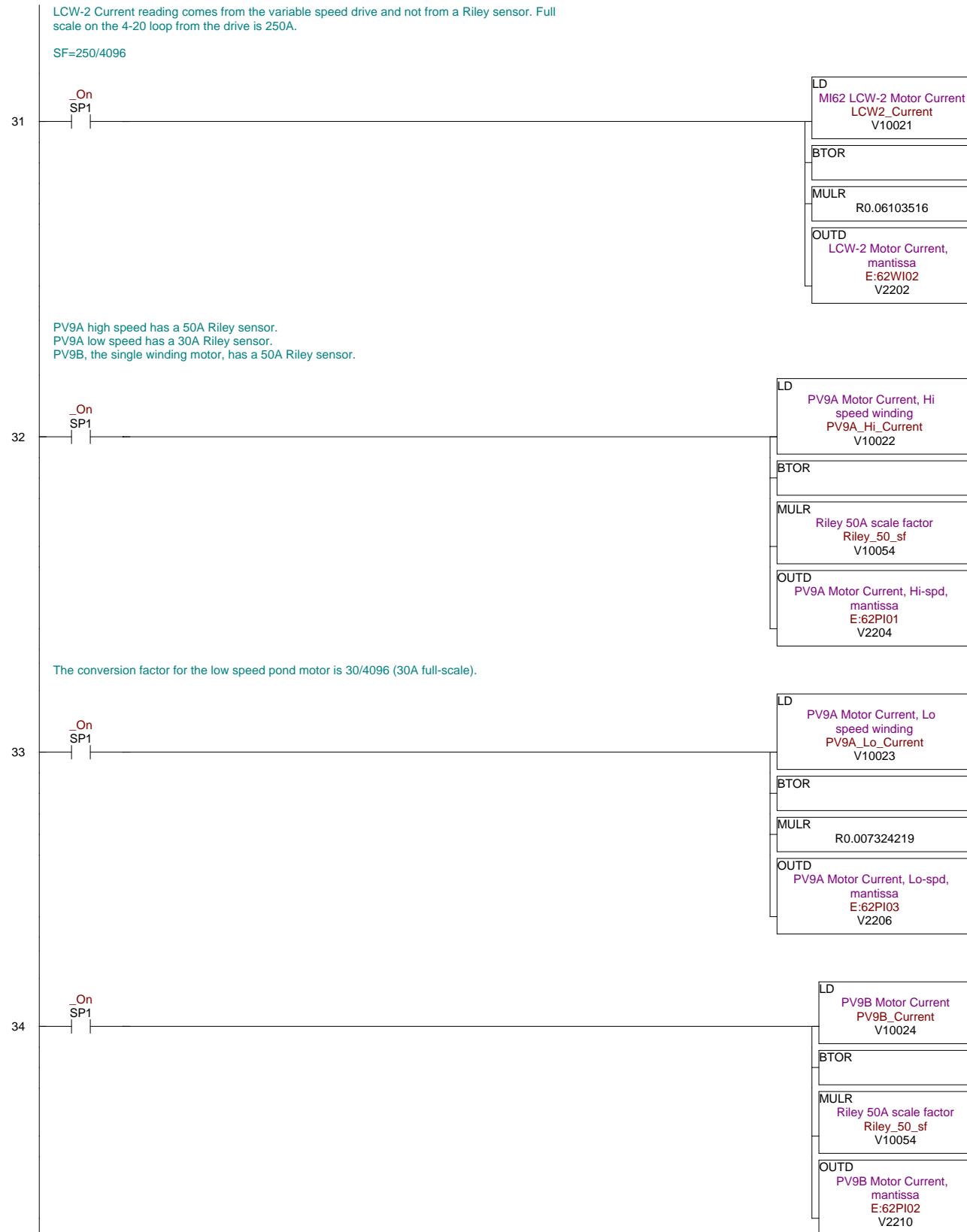
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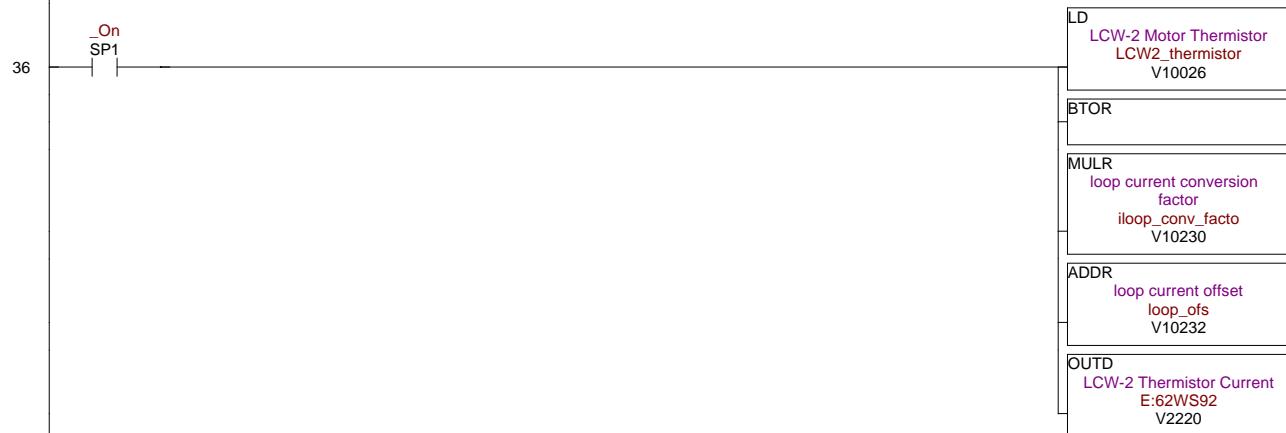
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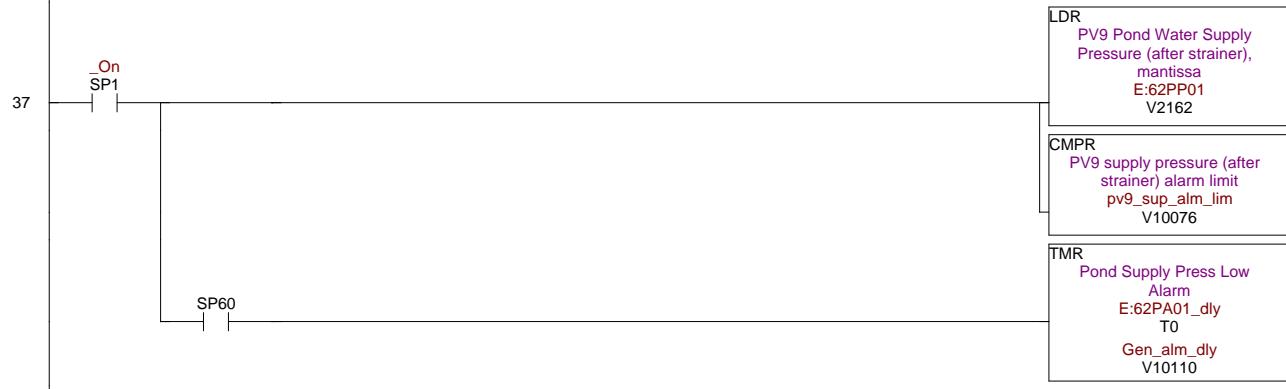
Thermistors embedded in the LCW motors monitor the temperature of the windings. The thermistors are wired to 24V through 1K resistors. If the current through a thermistor drops below 11mA, the motor is too hot to run.

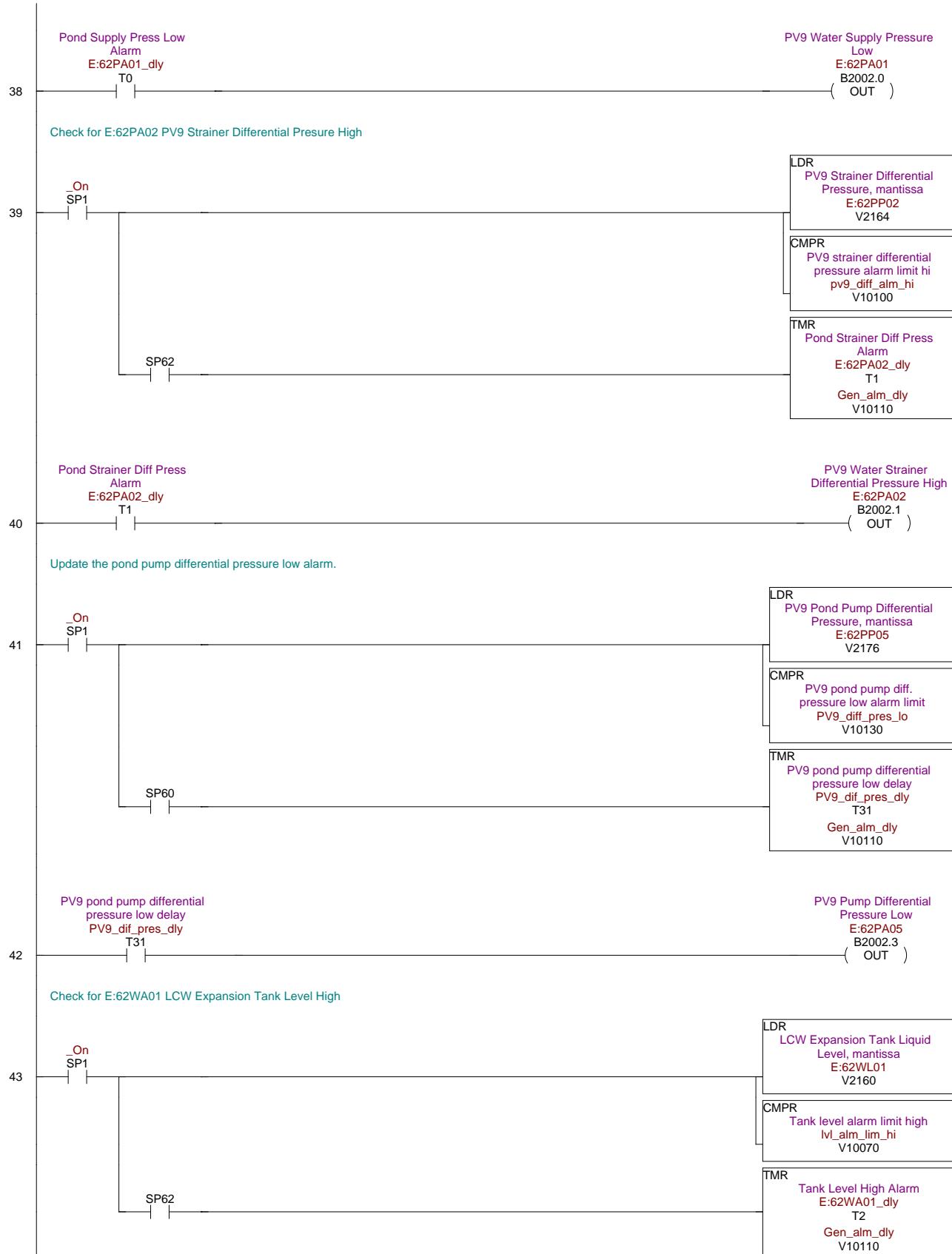


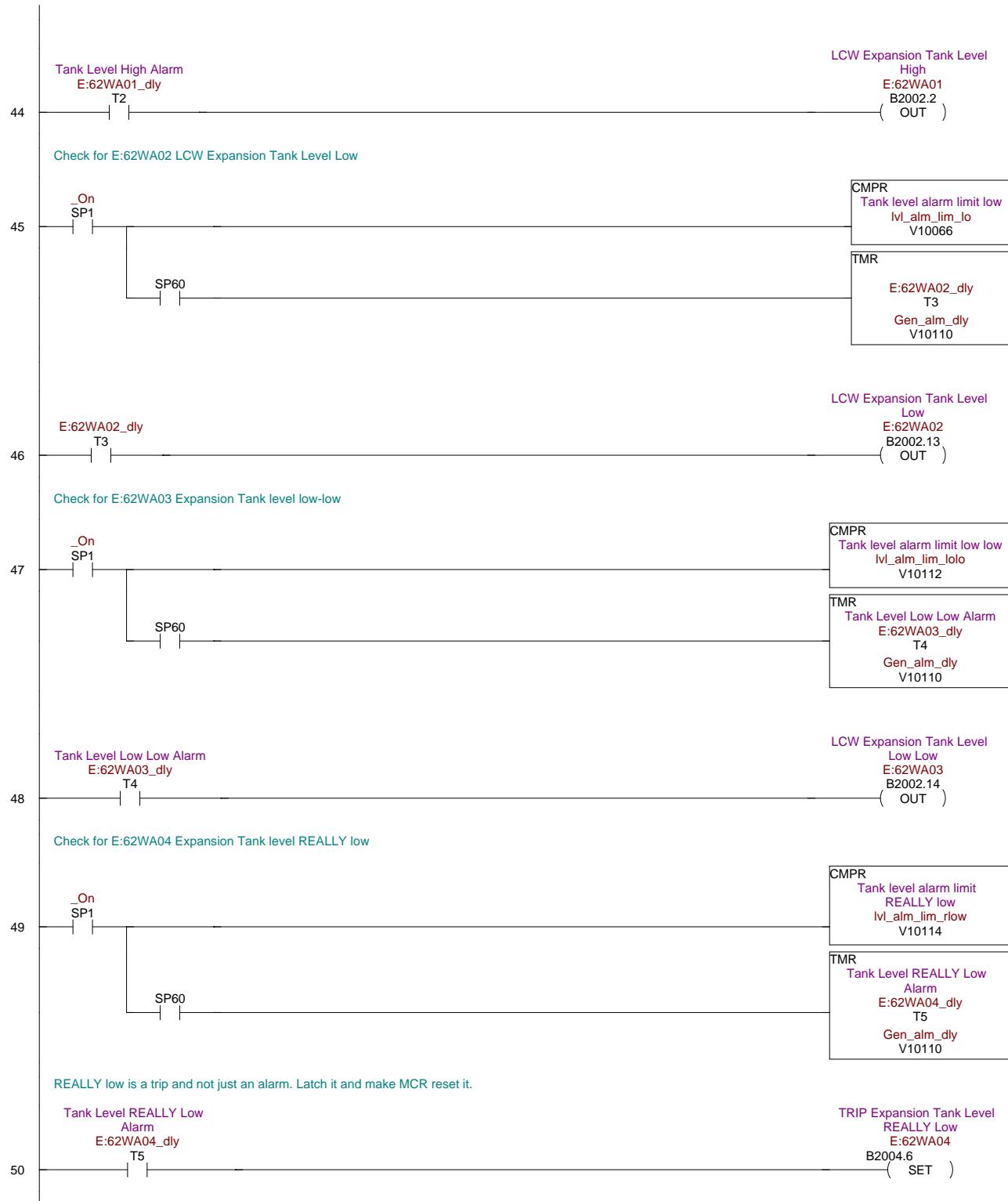
Alarm Processing

Each alarm condition is filtered by an up-counter. For an alarm to be triggered, the alarm comparison must be true long enough for a delay timer to exceed a predetermined value. If the comparison fails for even a single scan, the timer is reset, a new delay period starts, and the alarm is cleared.

Check for E:62PA01 PV9 Supply Pressure Low ***THIS ALARM IS DISABLED BY SETTING THE LIMIT TO ZERO!!!***



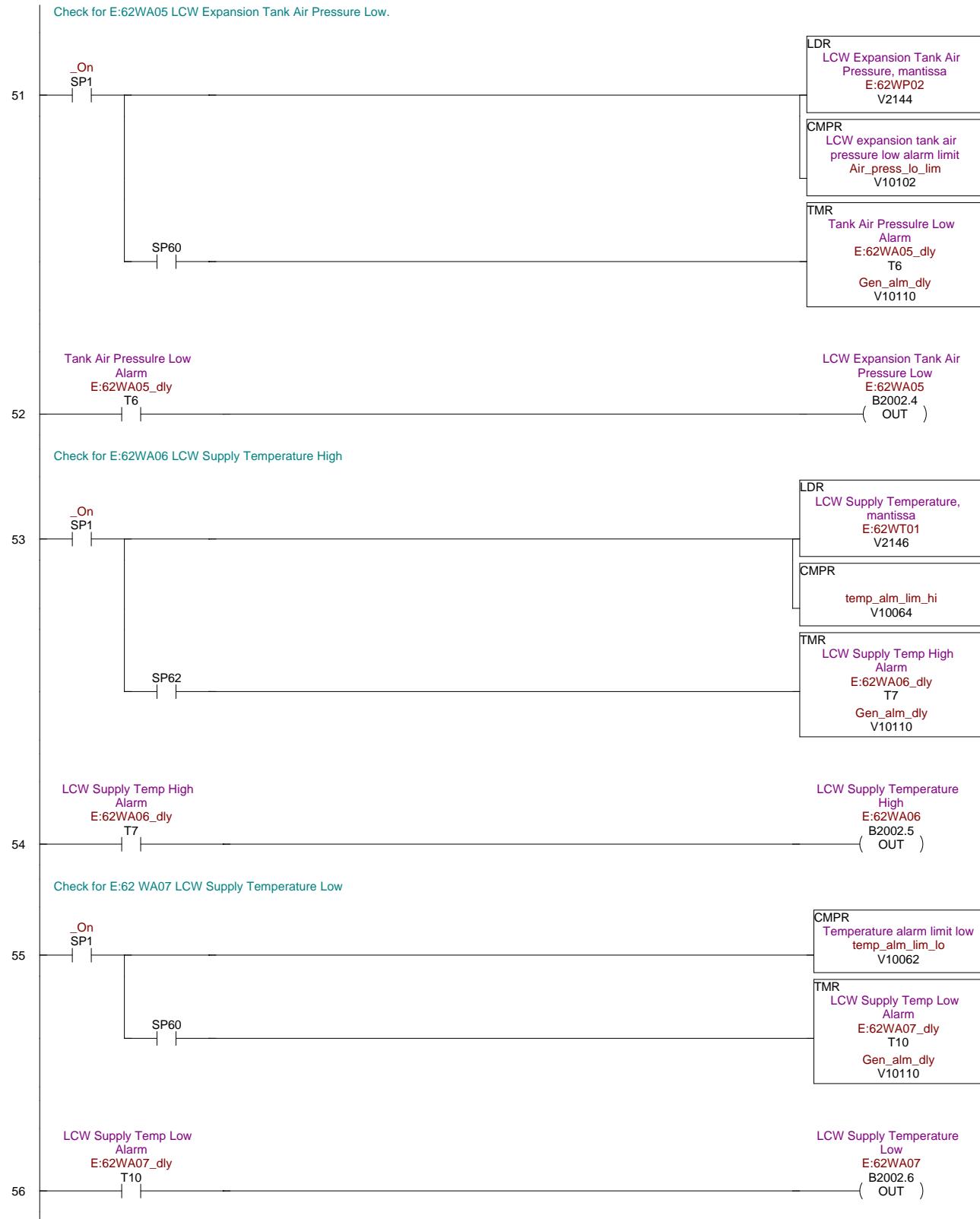


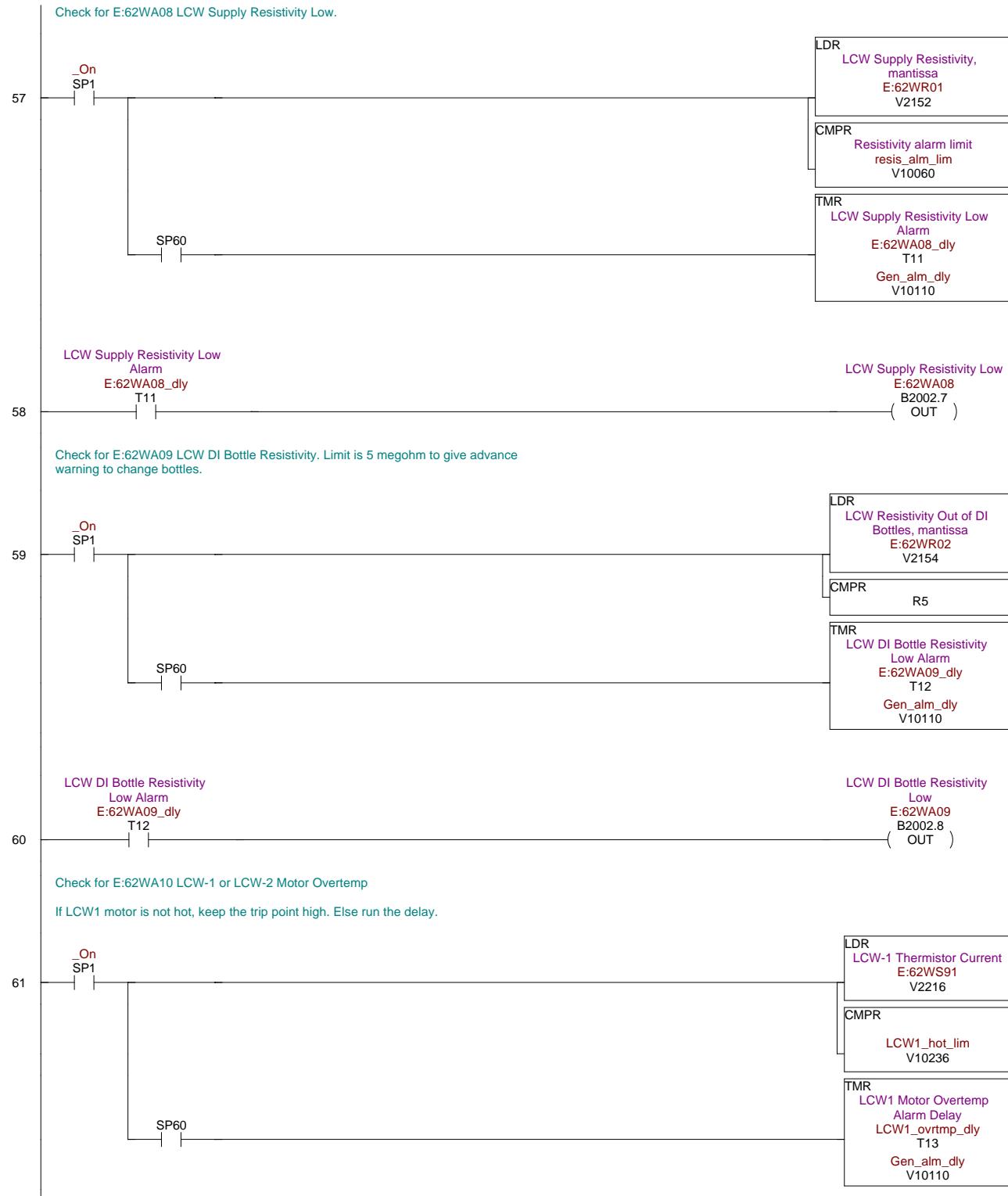


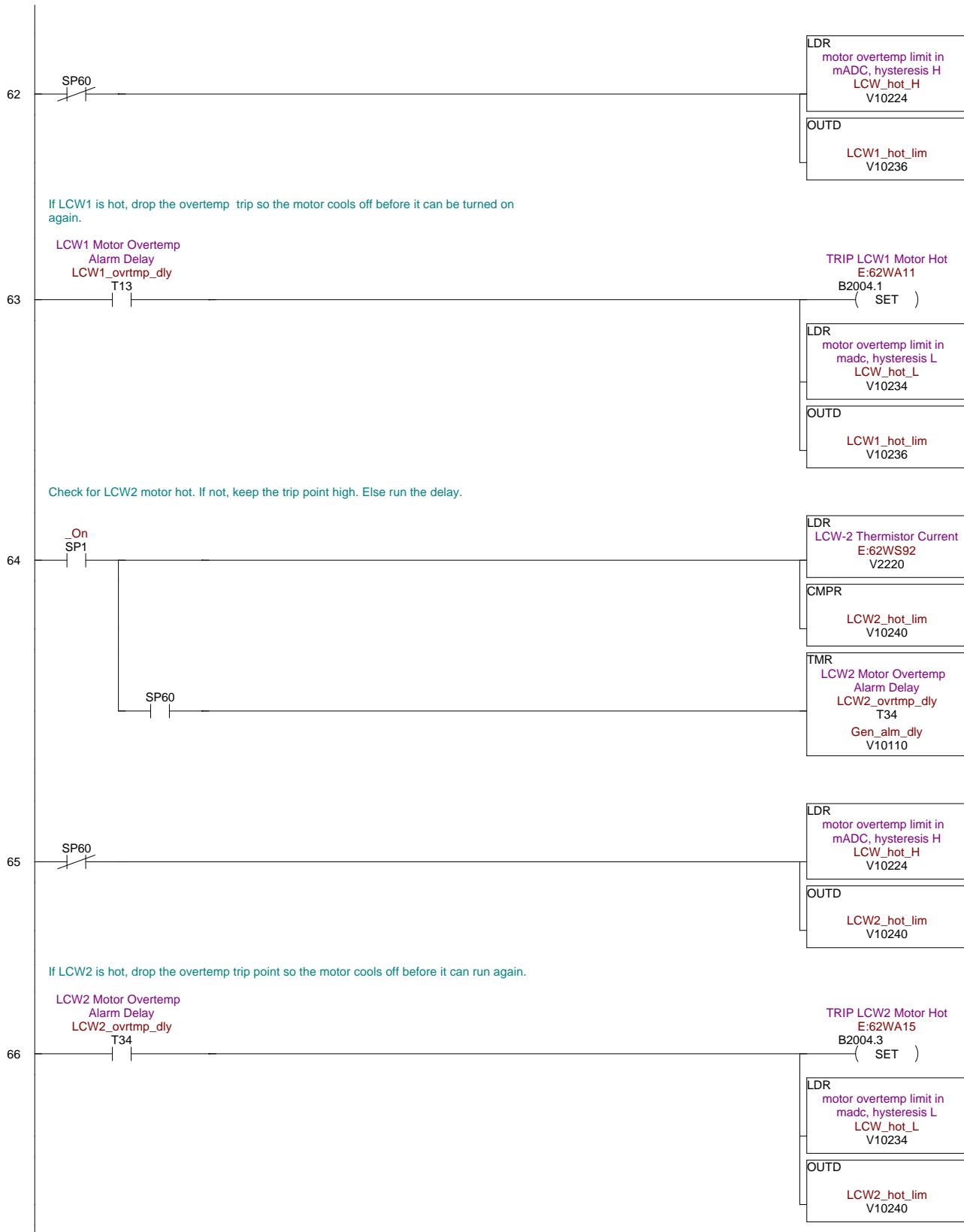
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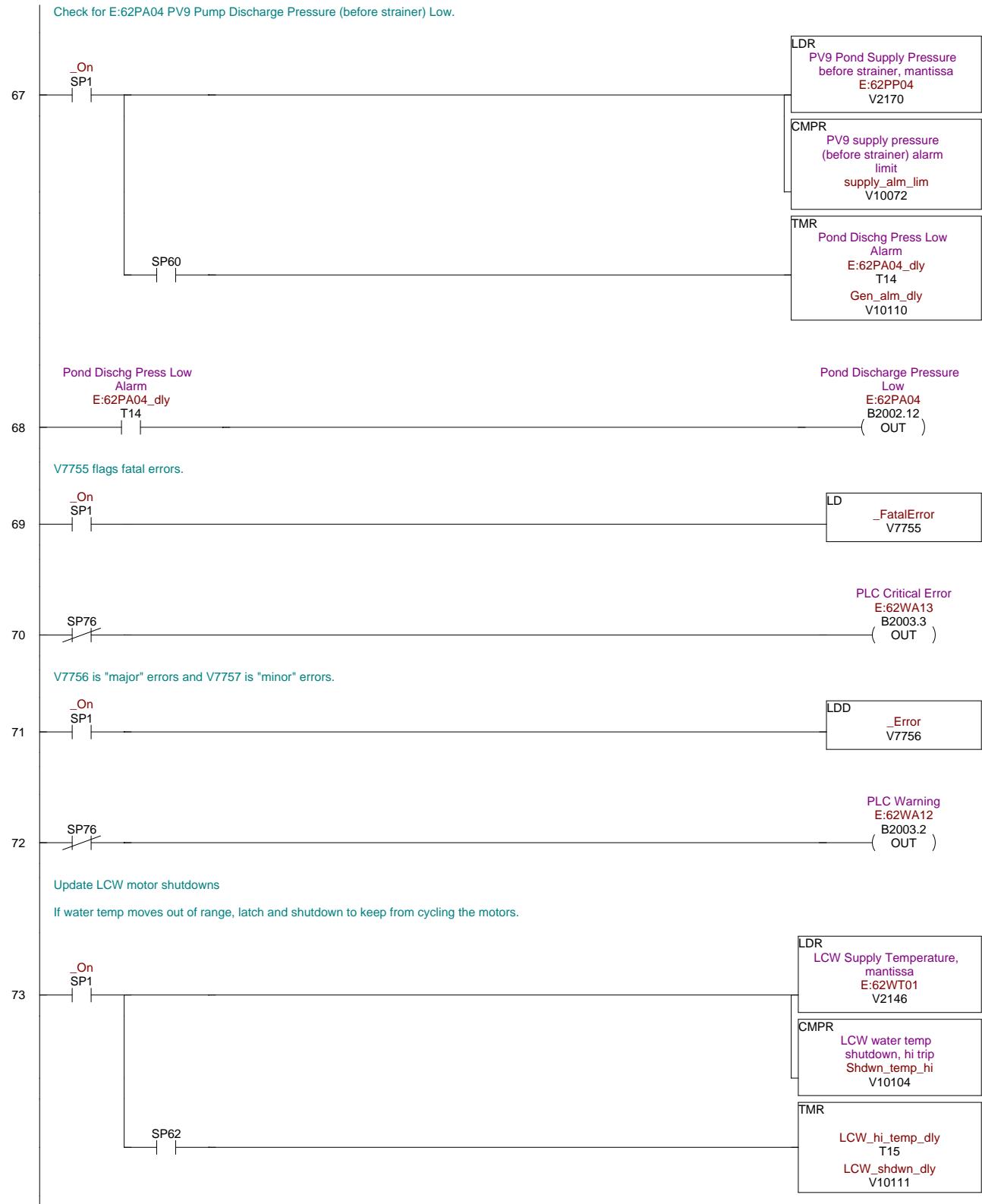
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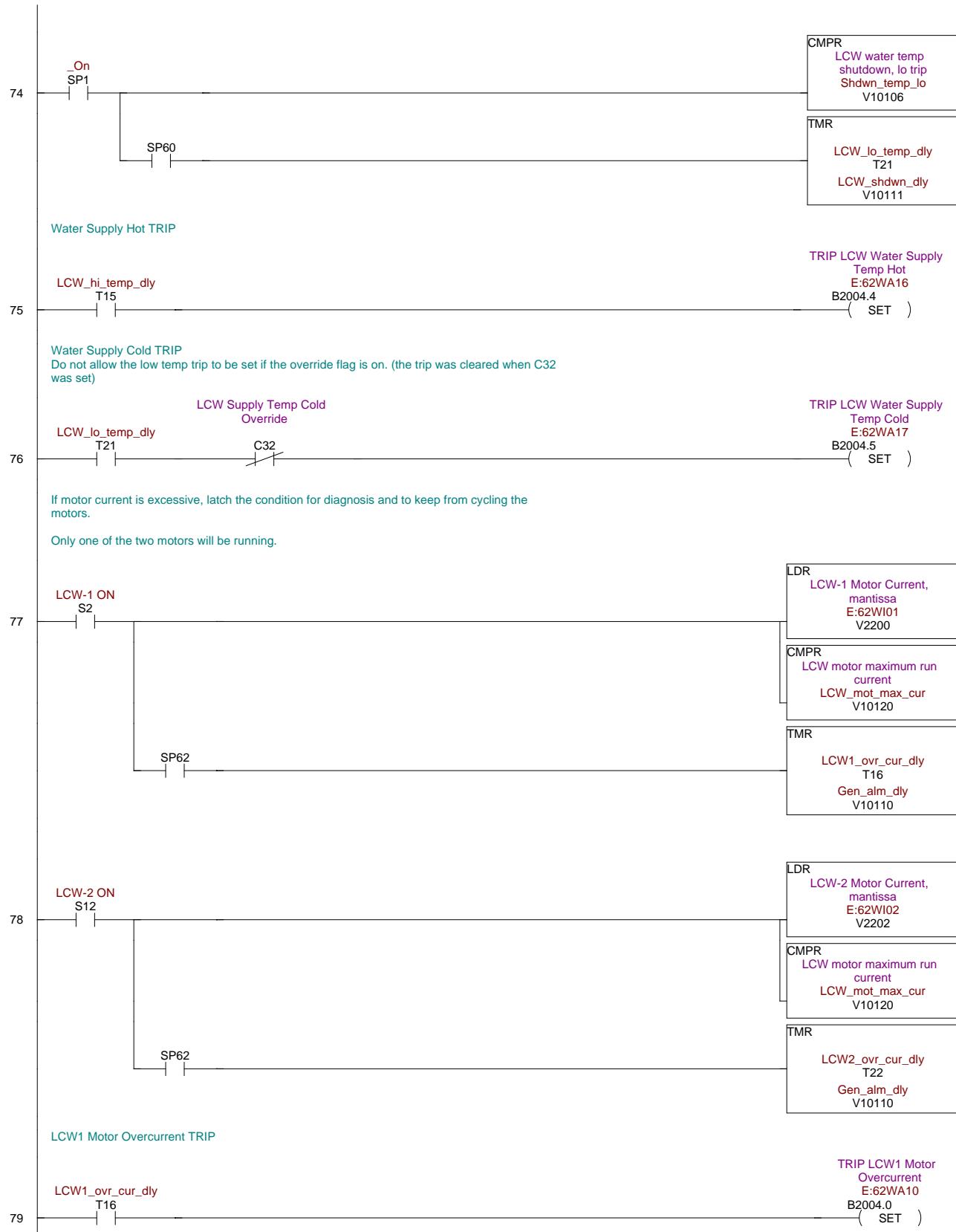


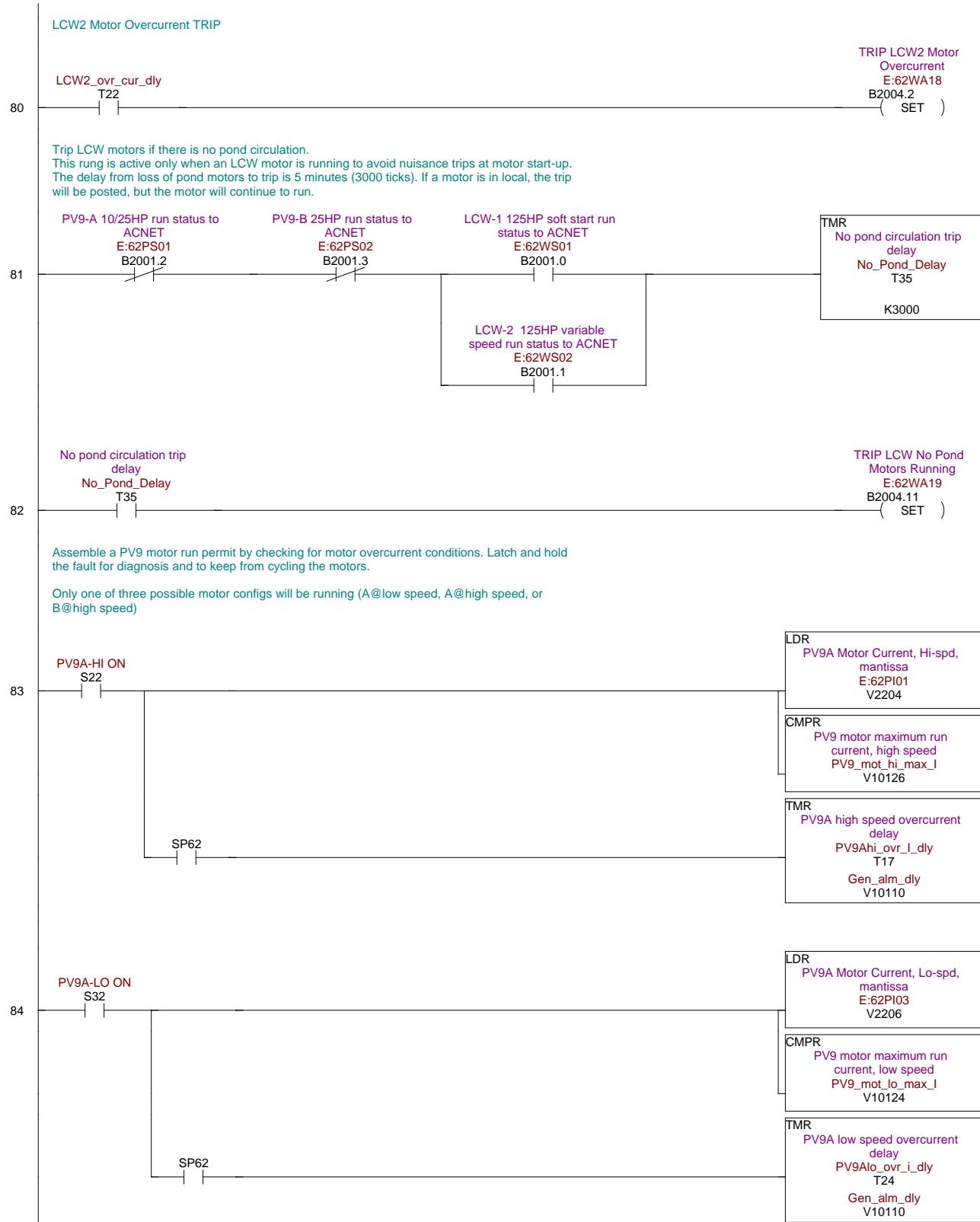


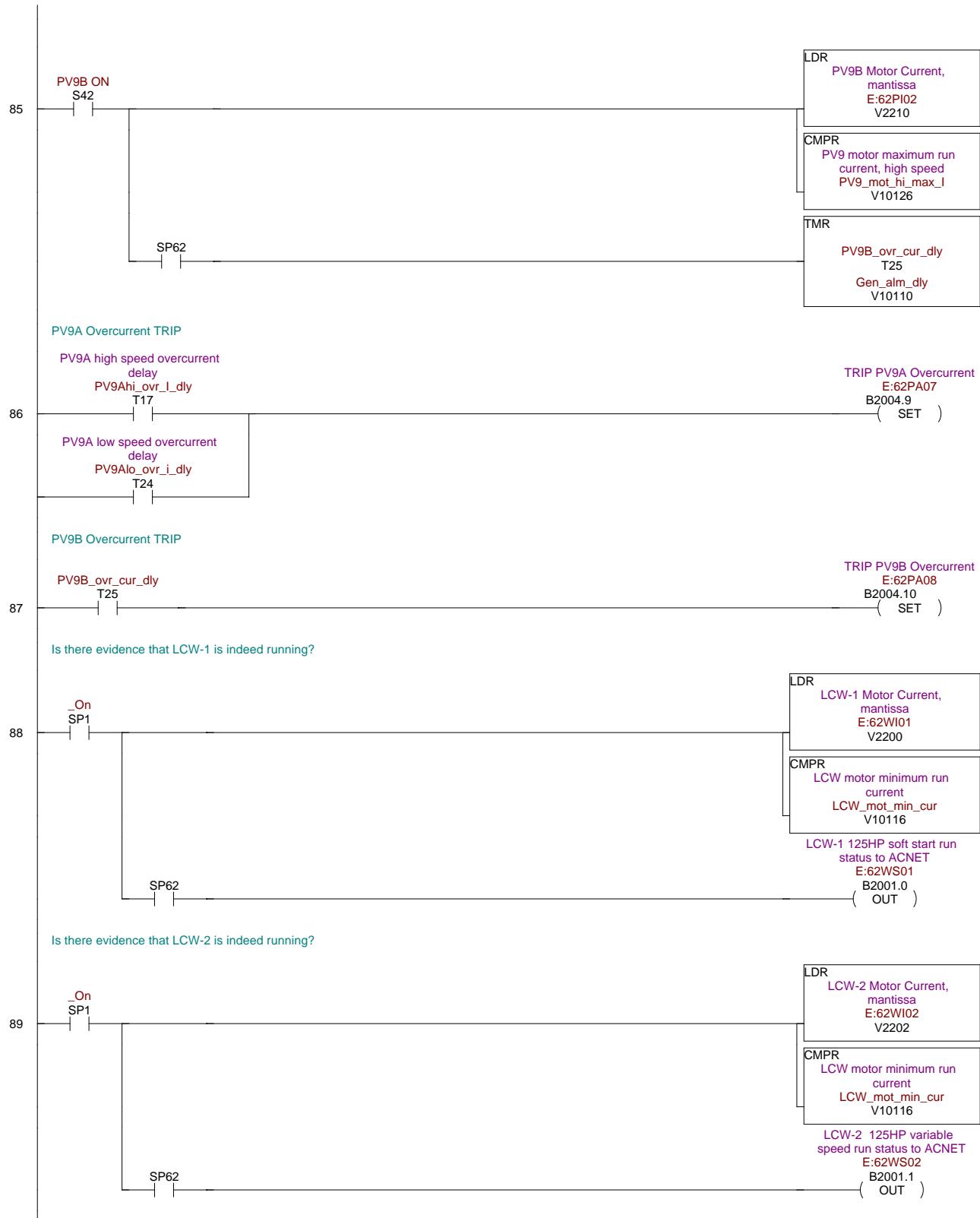
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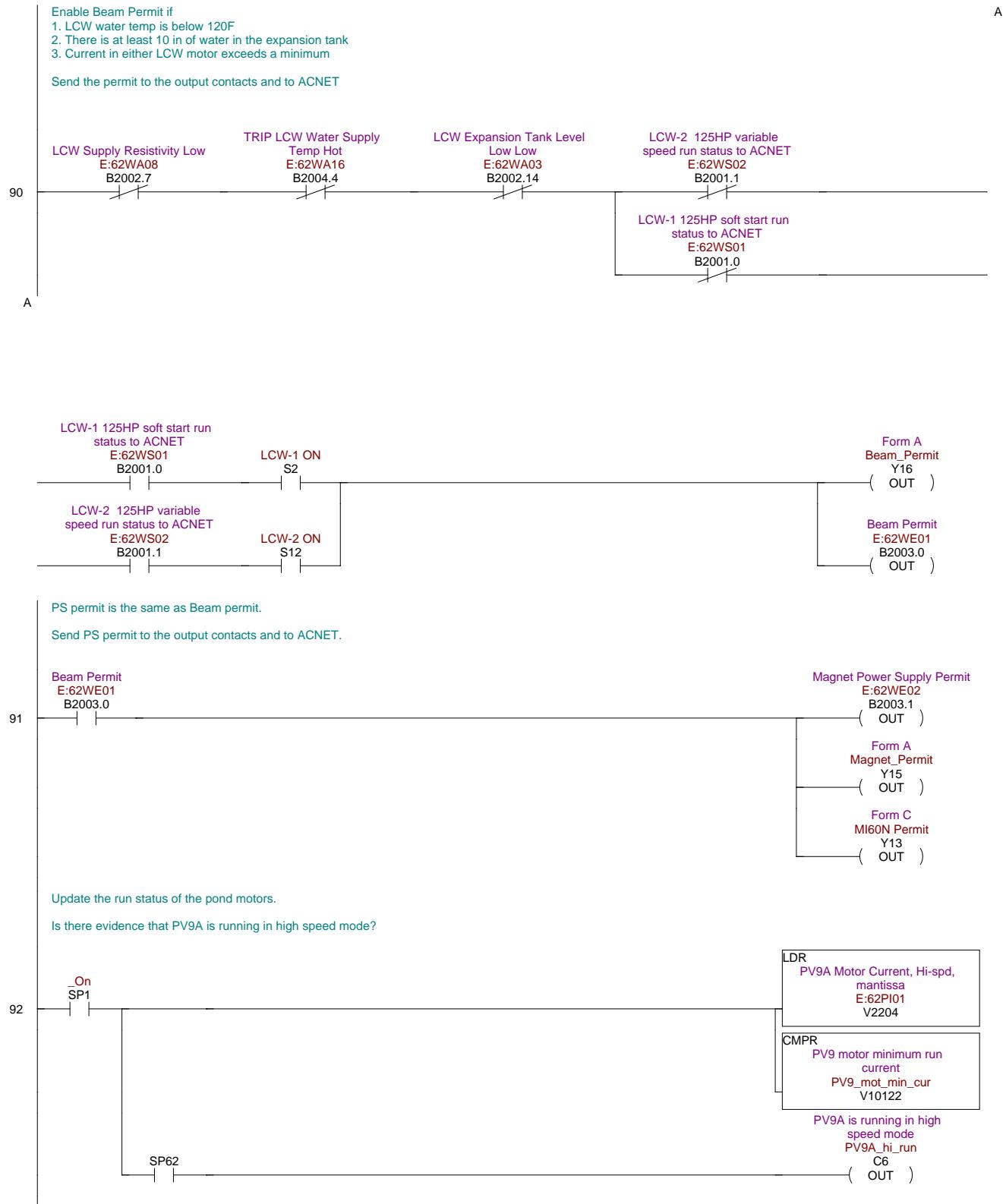
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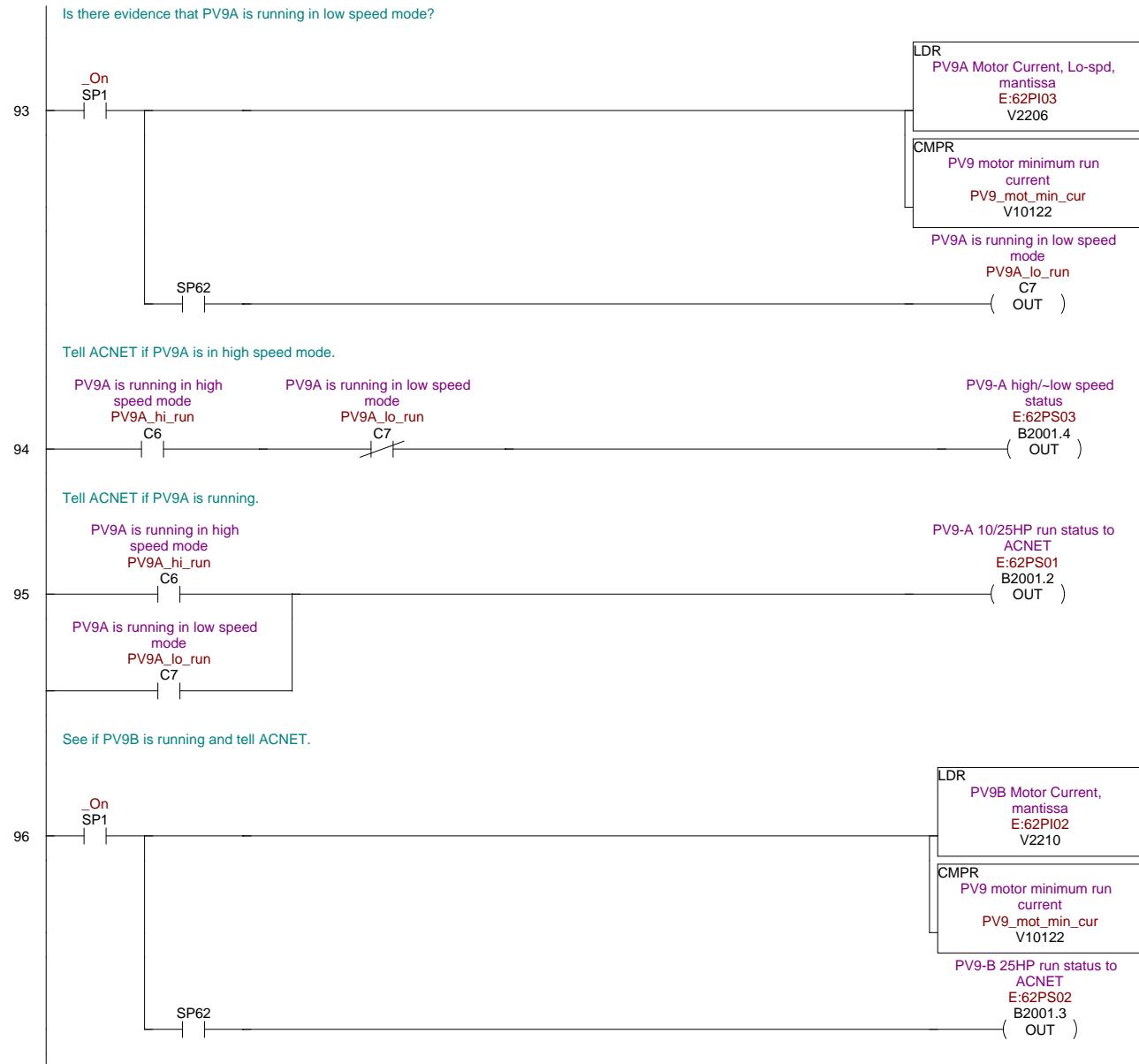
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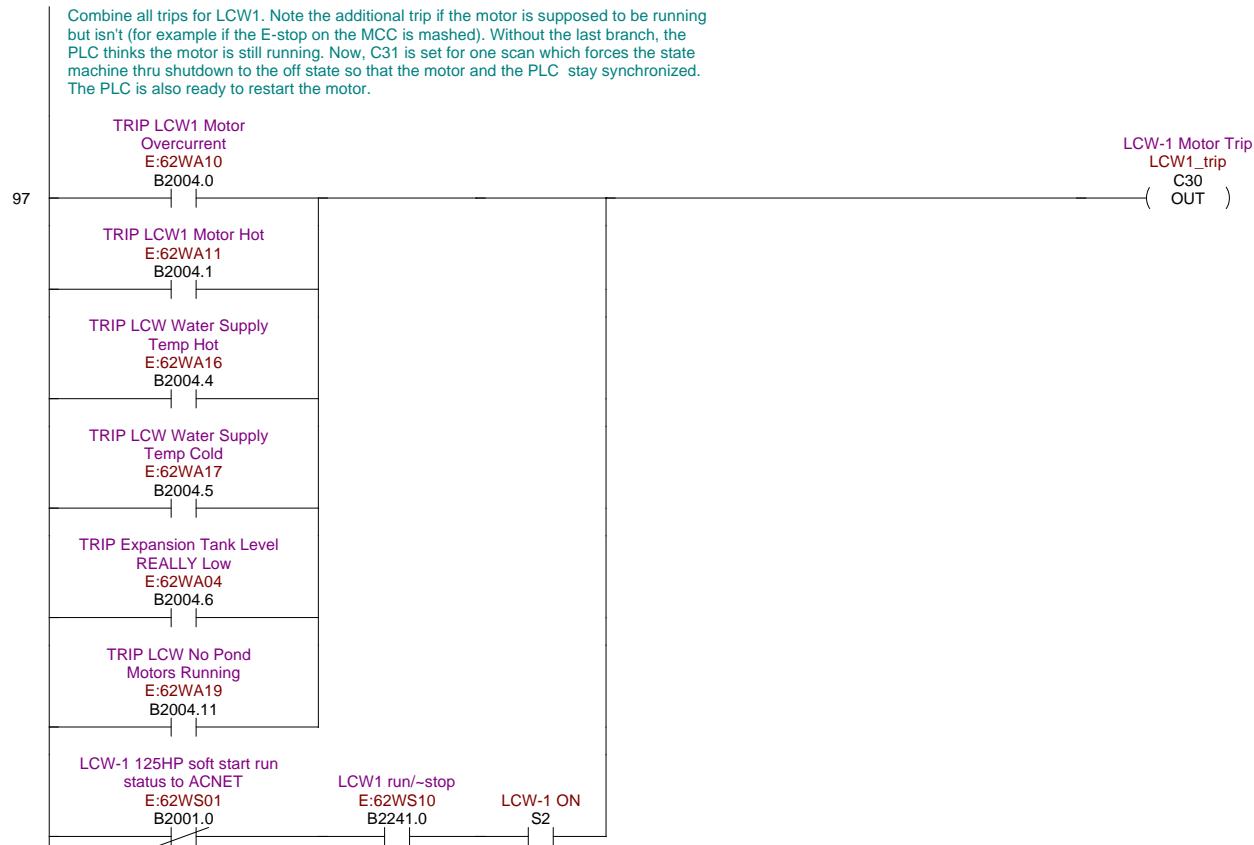




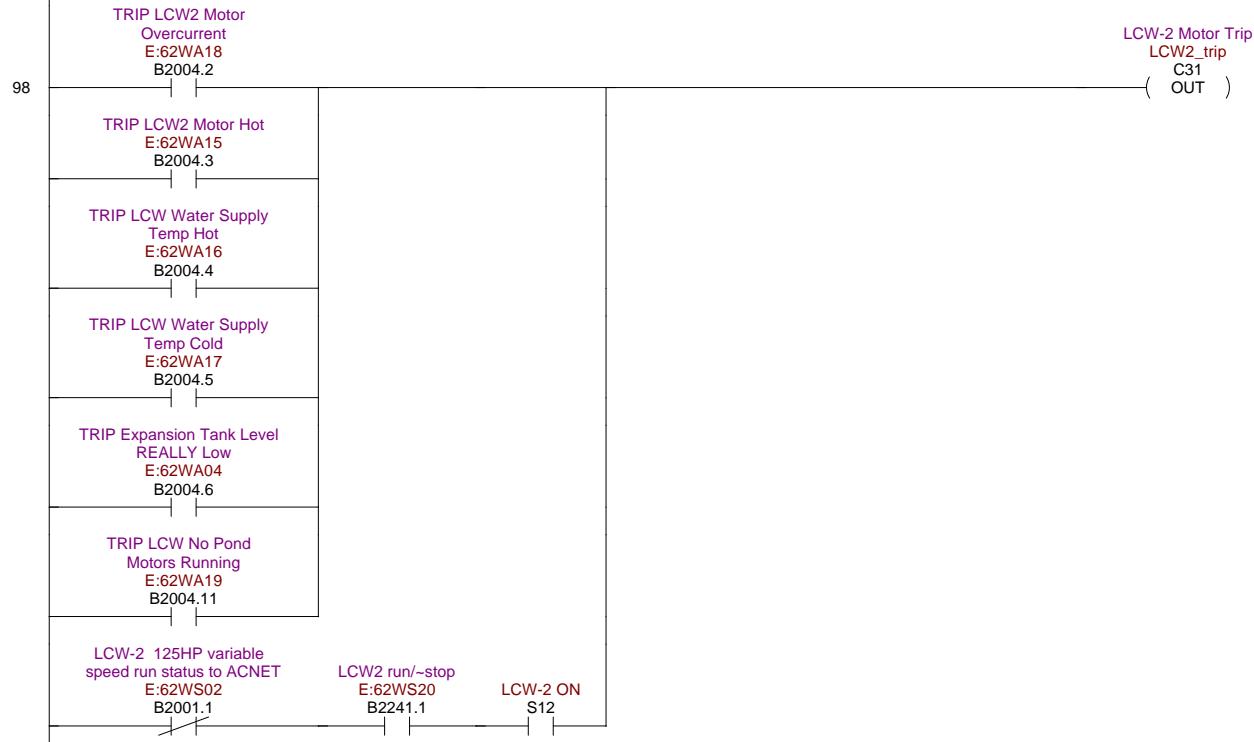


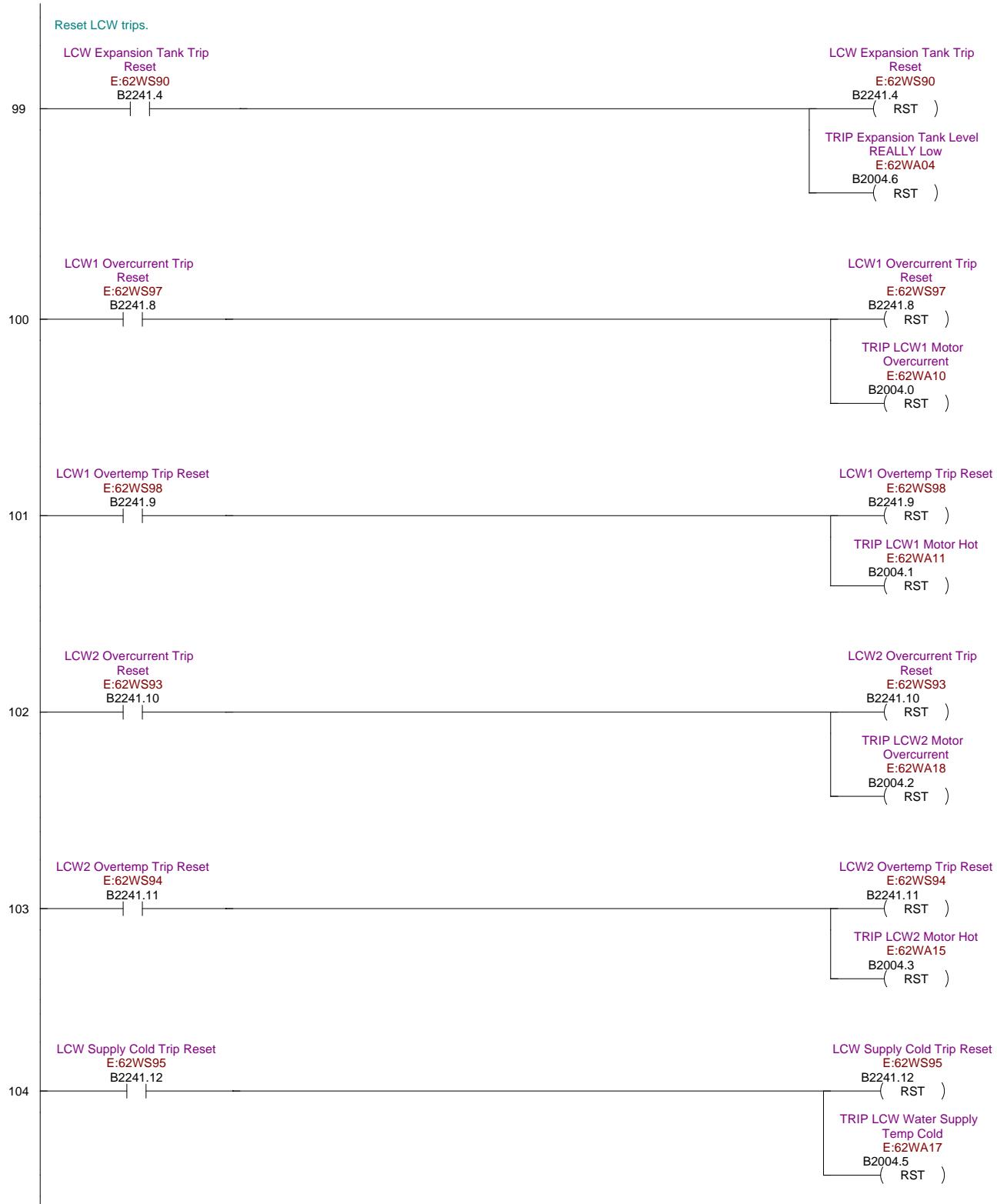


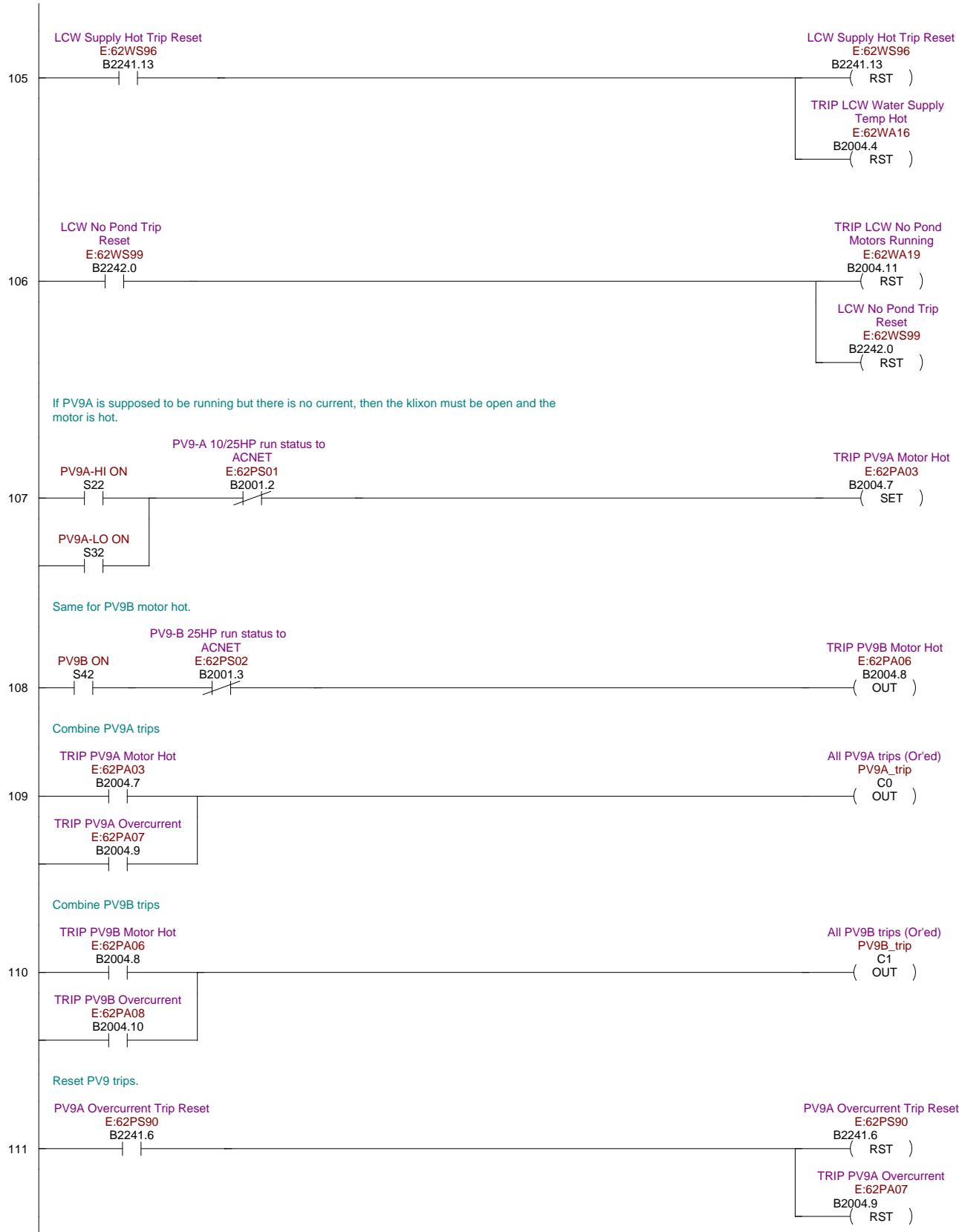


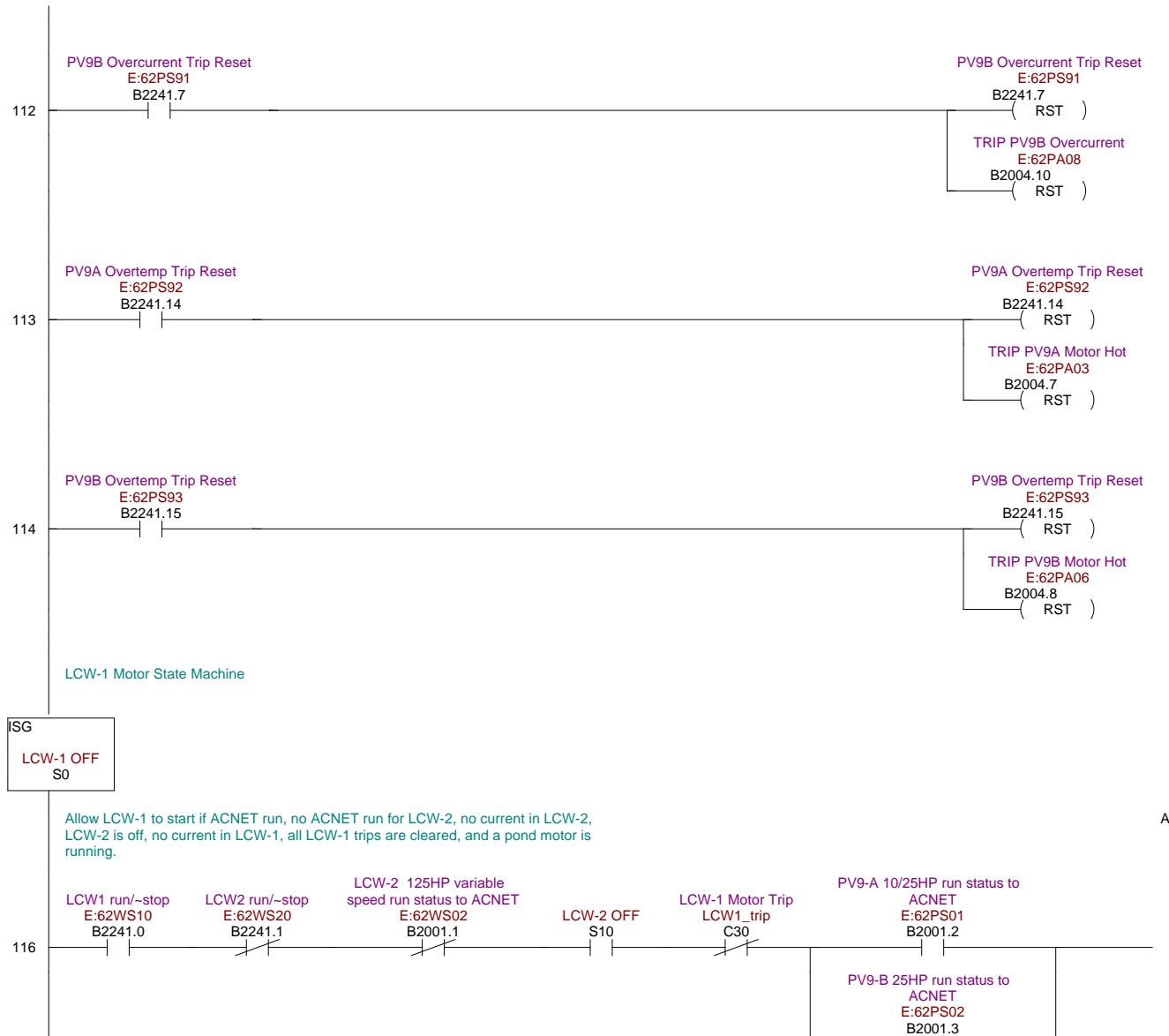


Do the same with trips for LCW-2. Note the additional trip if the motor is supposed to be running but isn't (for example if the E-stop on the MCC is mashed). Without the last branch, the PLC thinks the motor is still running. Now, C31 is set for one scan which forces the state machine thru shutdown to the off state so that the motor and the PLC stay synchronized. The PLC is also ready to restart the motor.



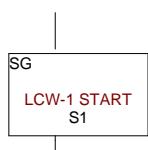


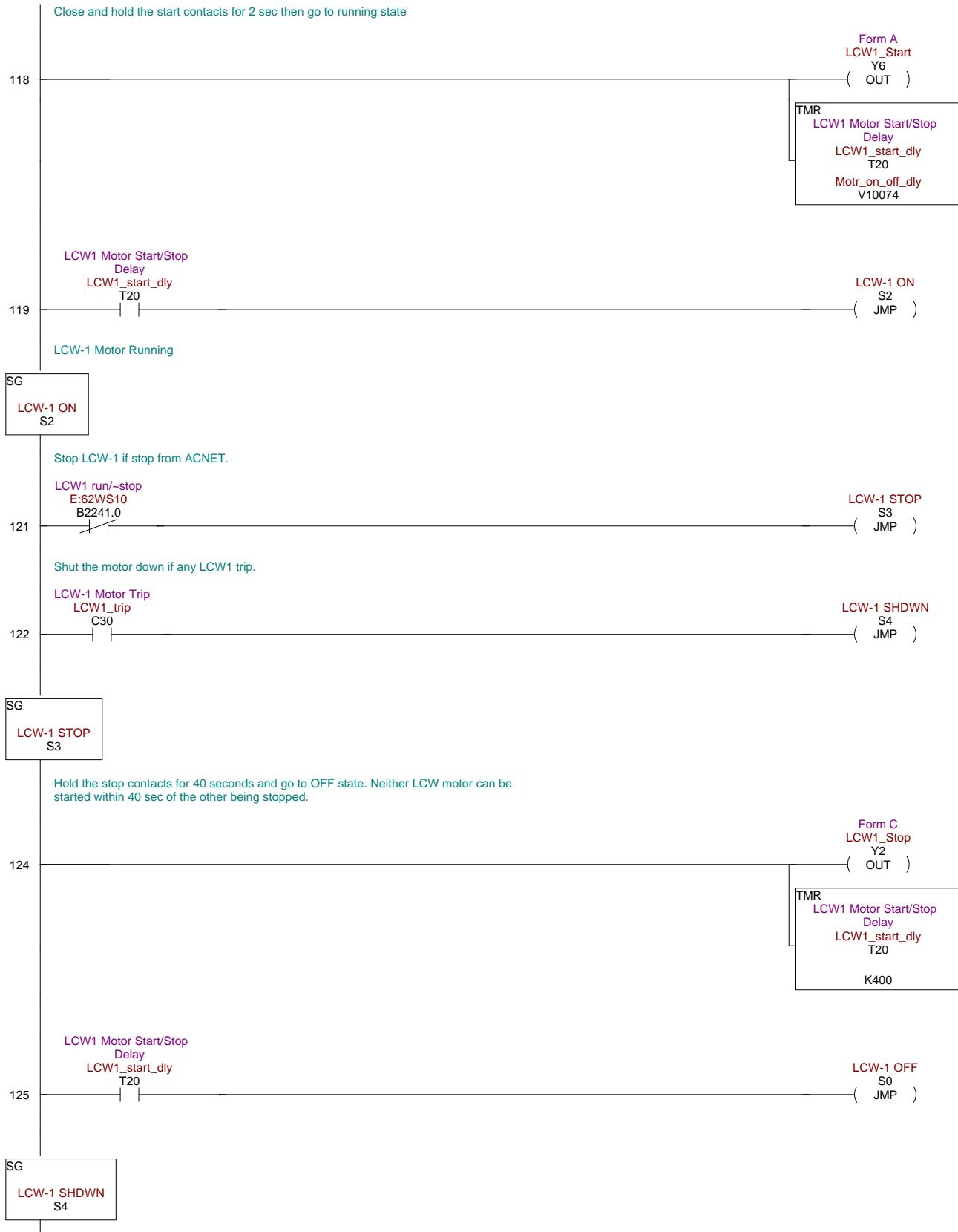


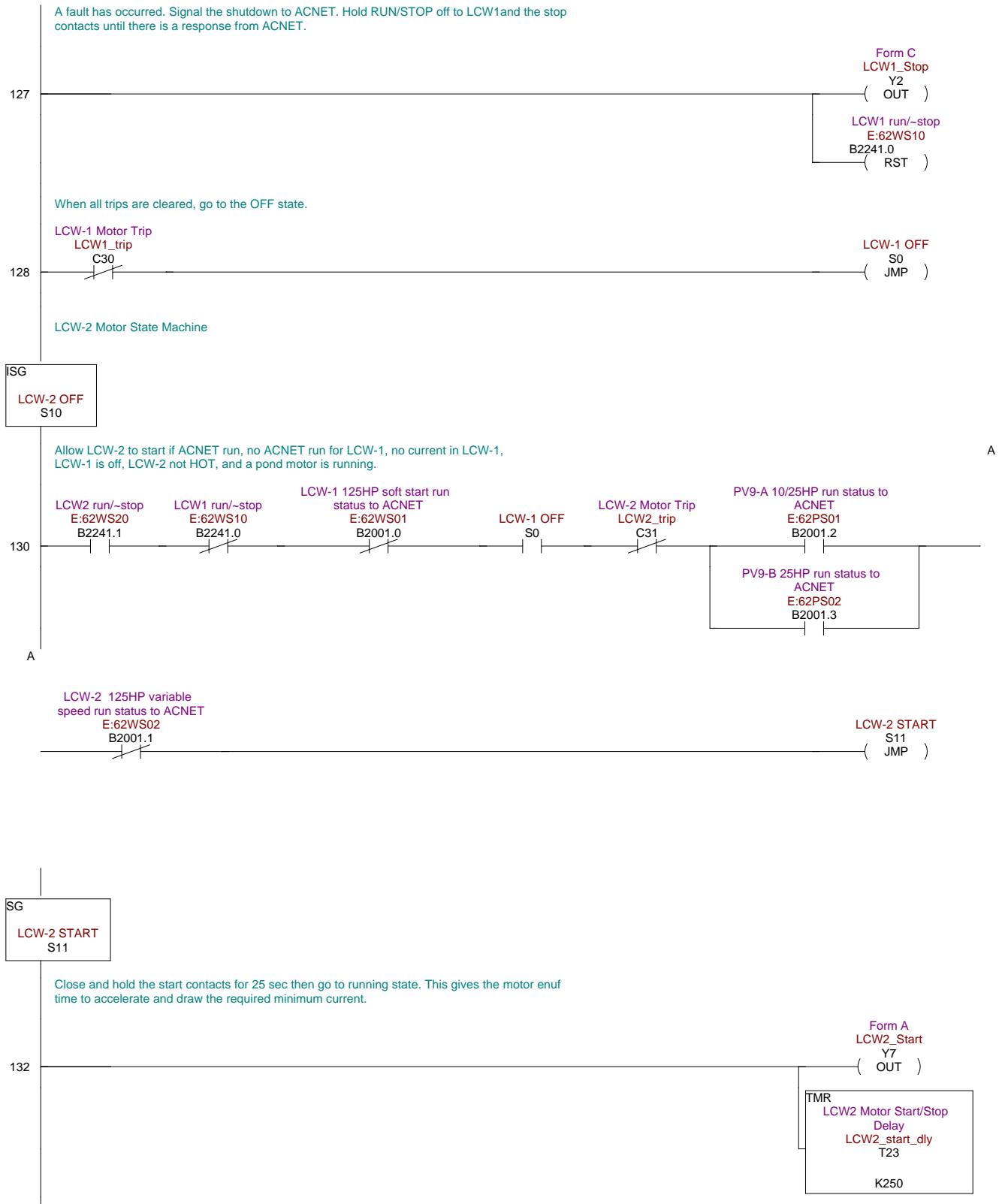


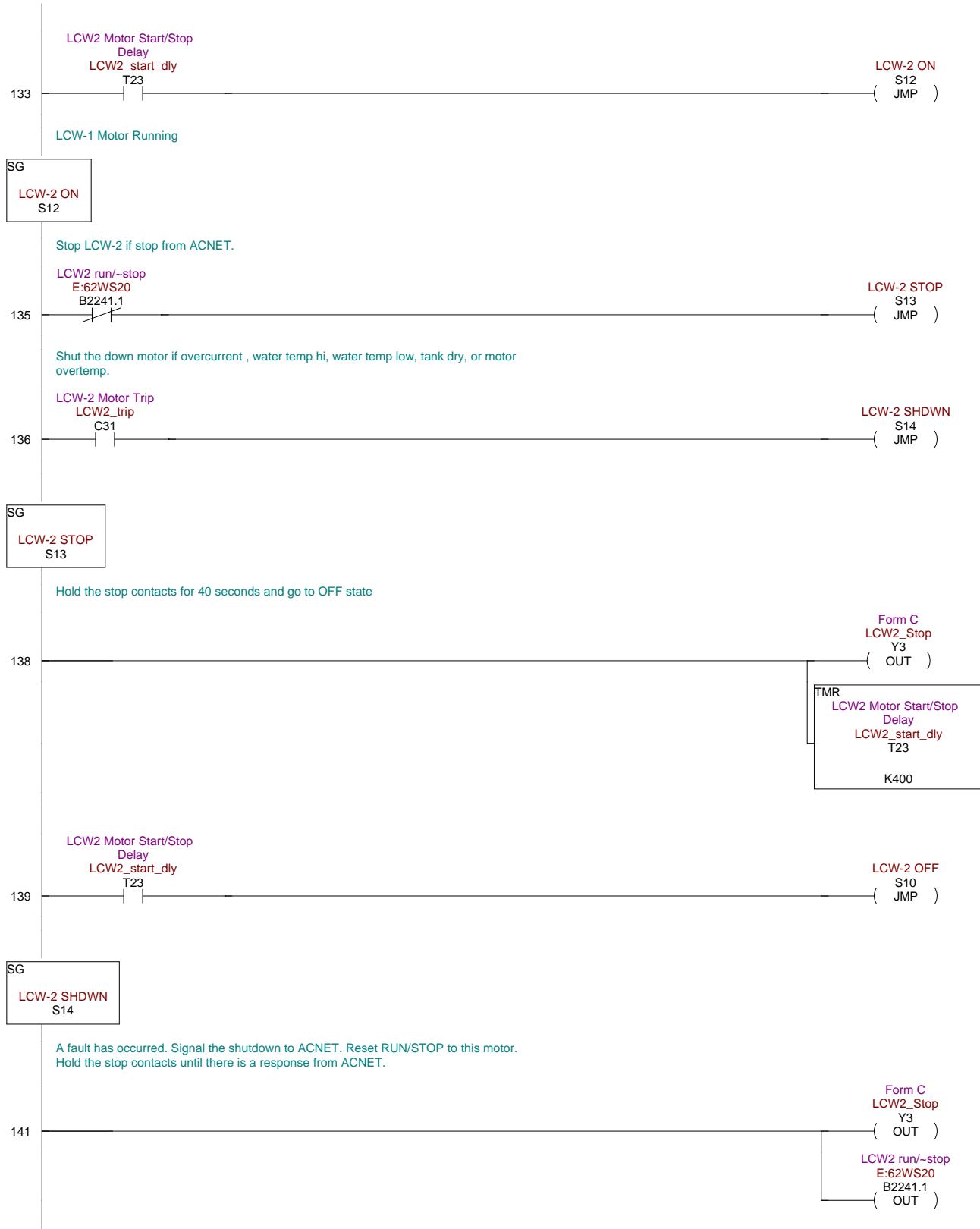
LCW-1 125HP soft start run status to ACNET
E:62WS01
B2001.0

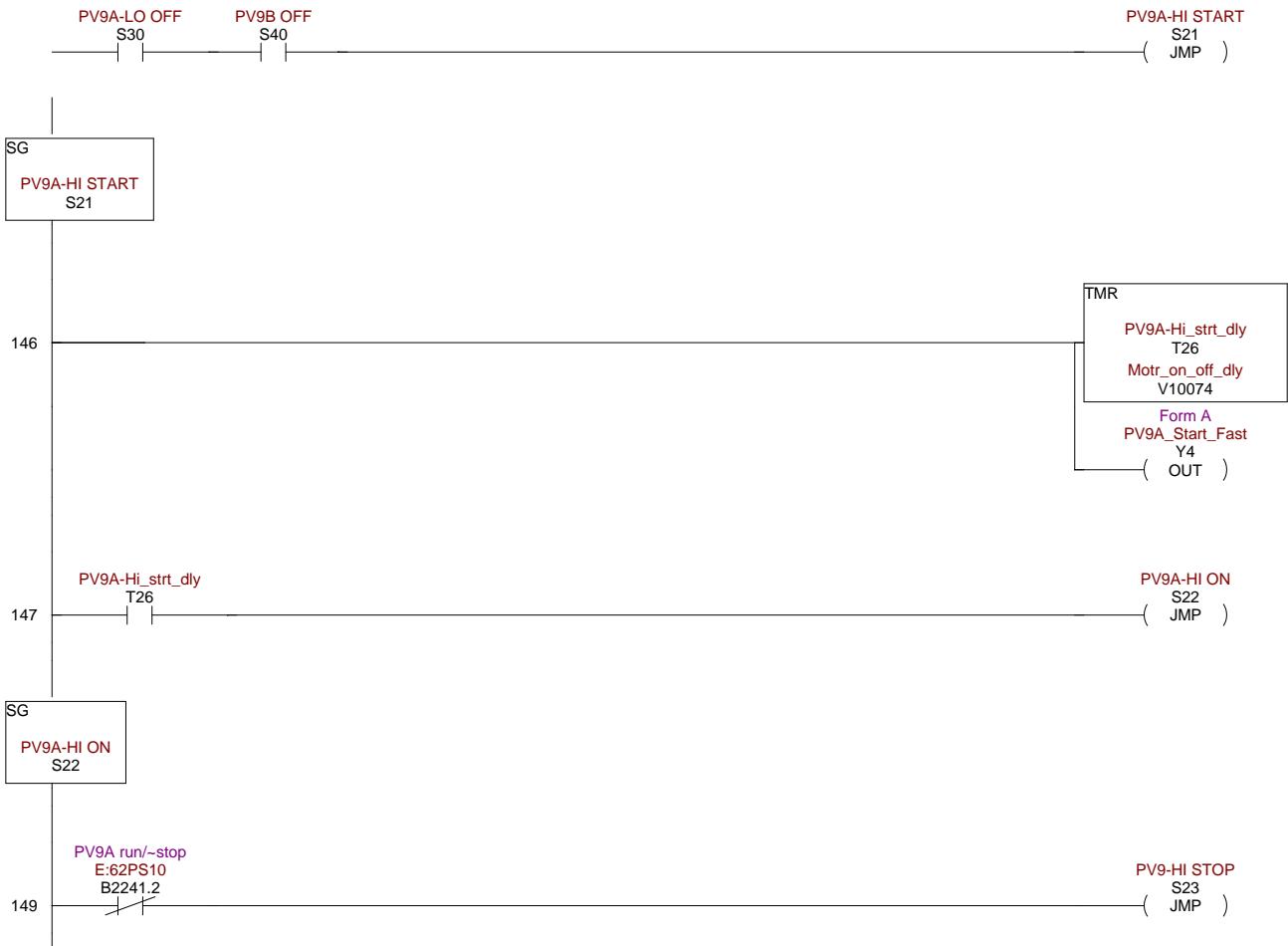
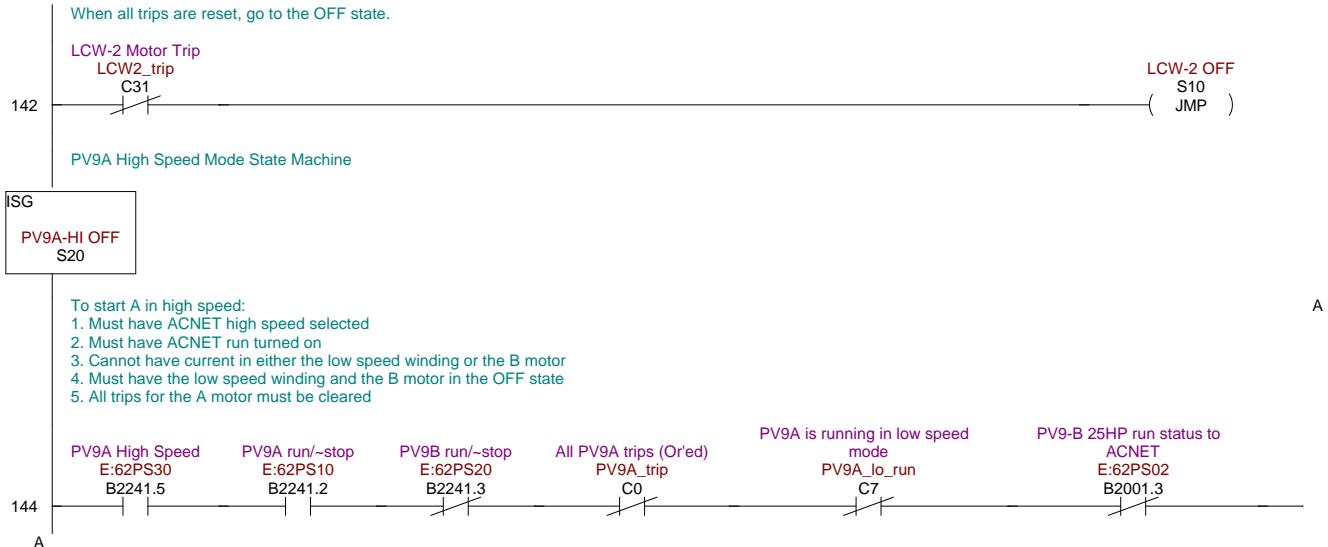
LCW-1 START
S1
(JMP)

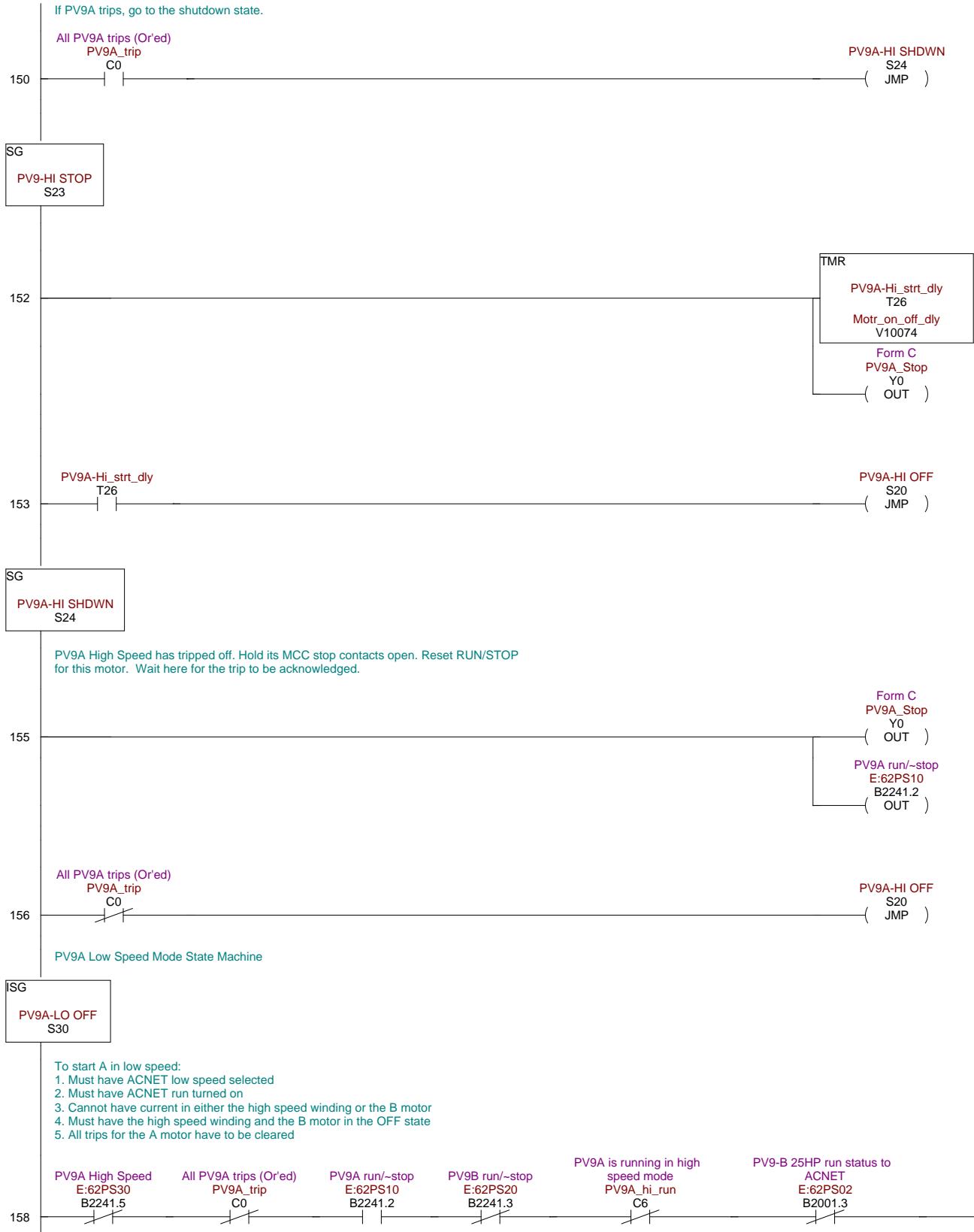




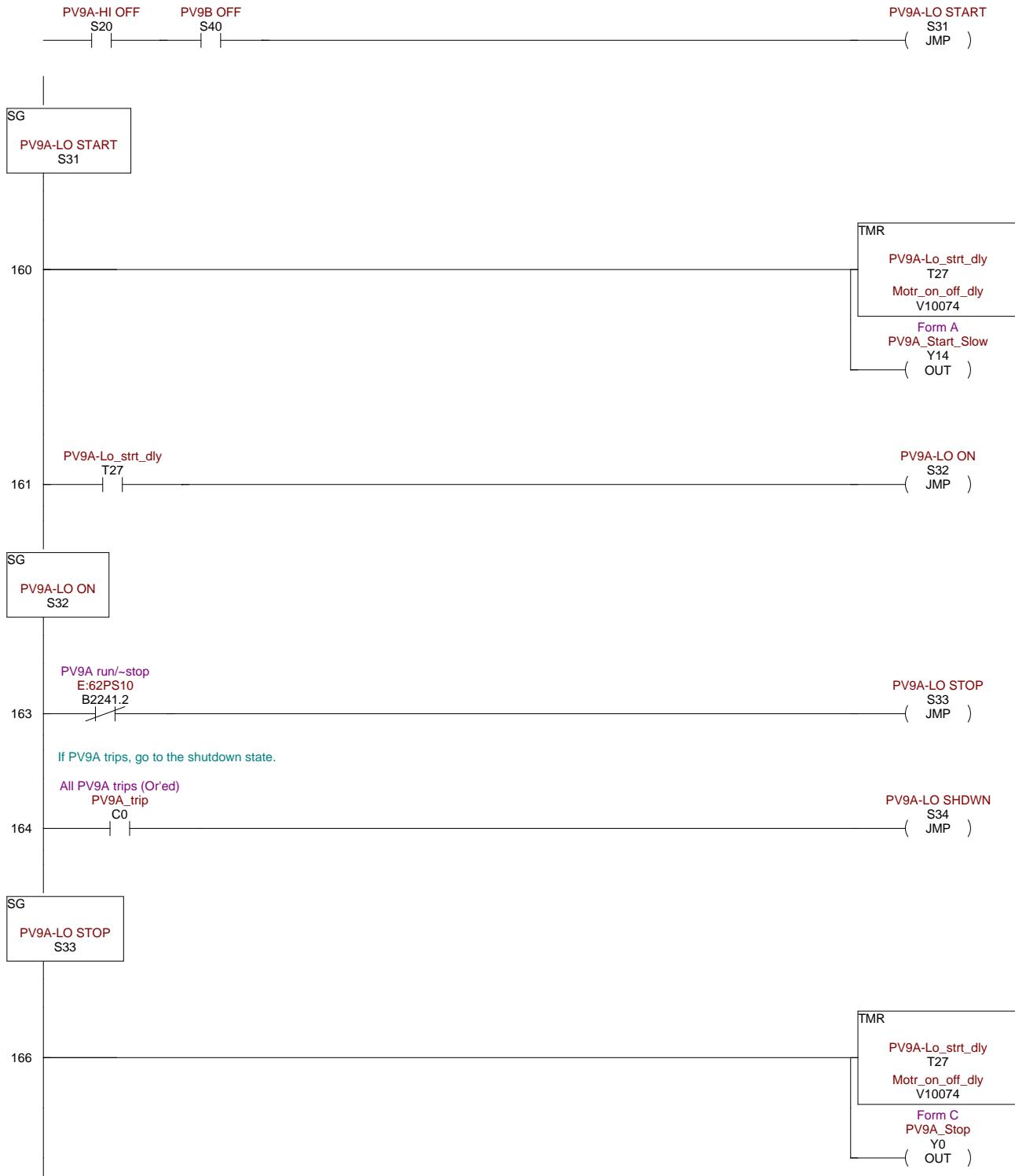


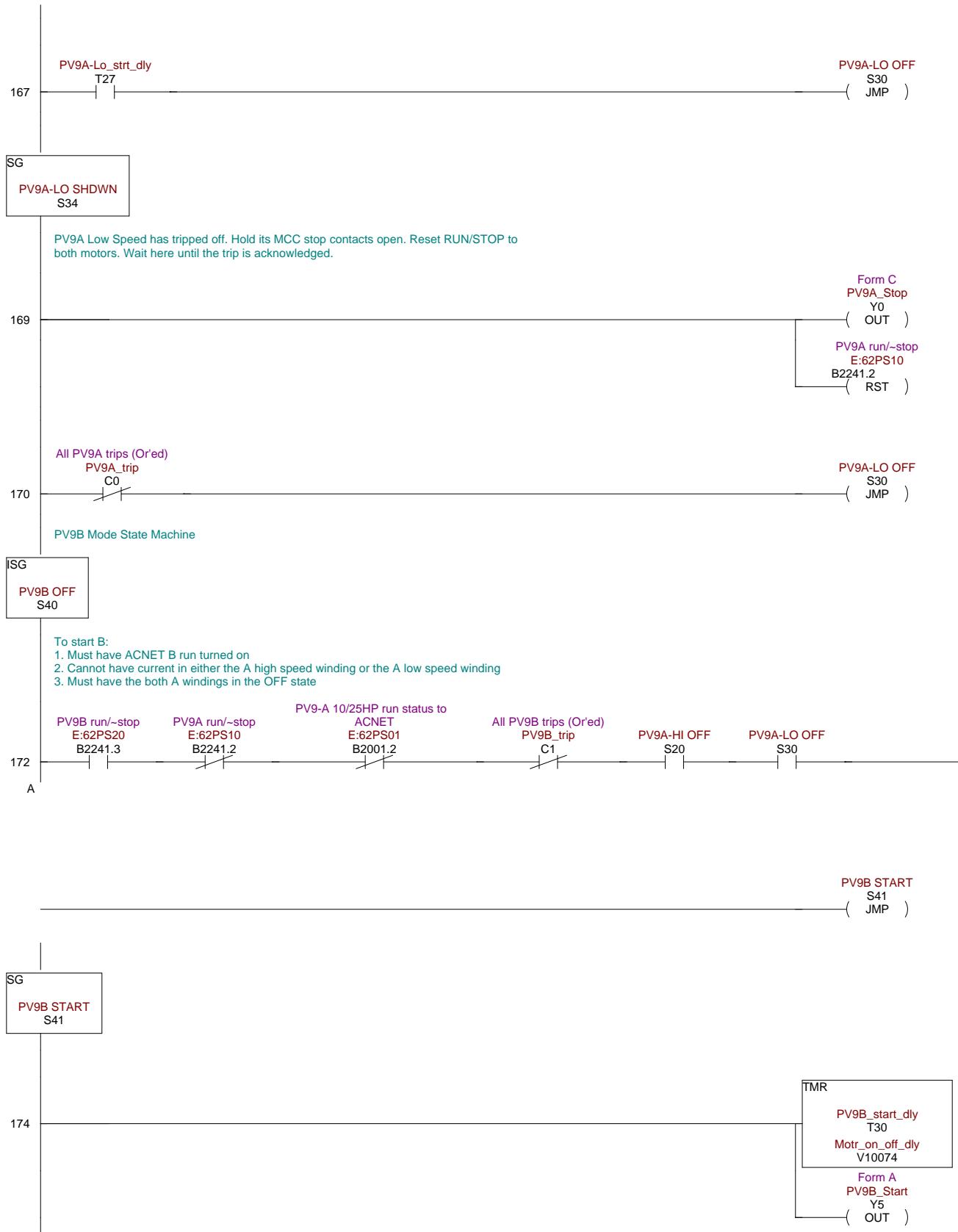


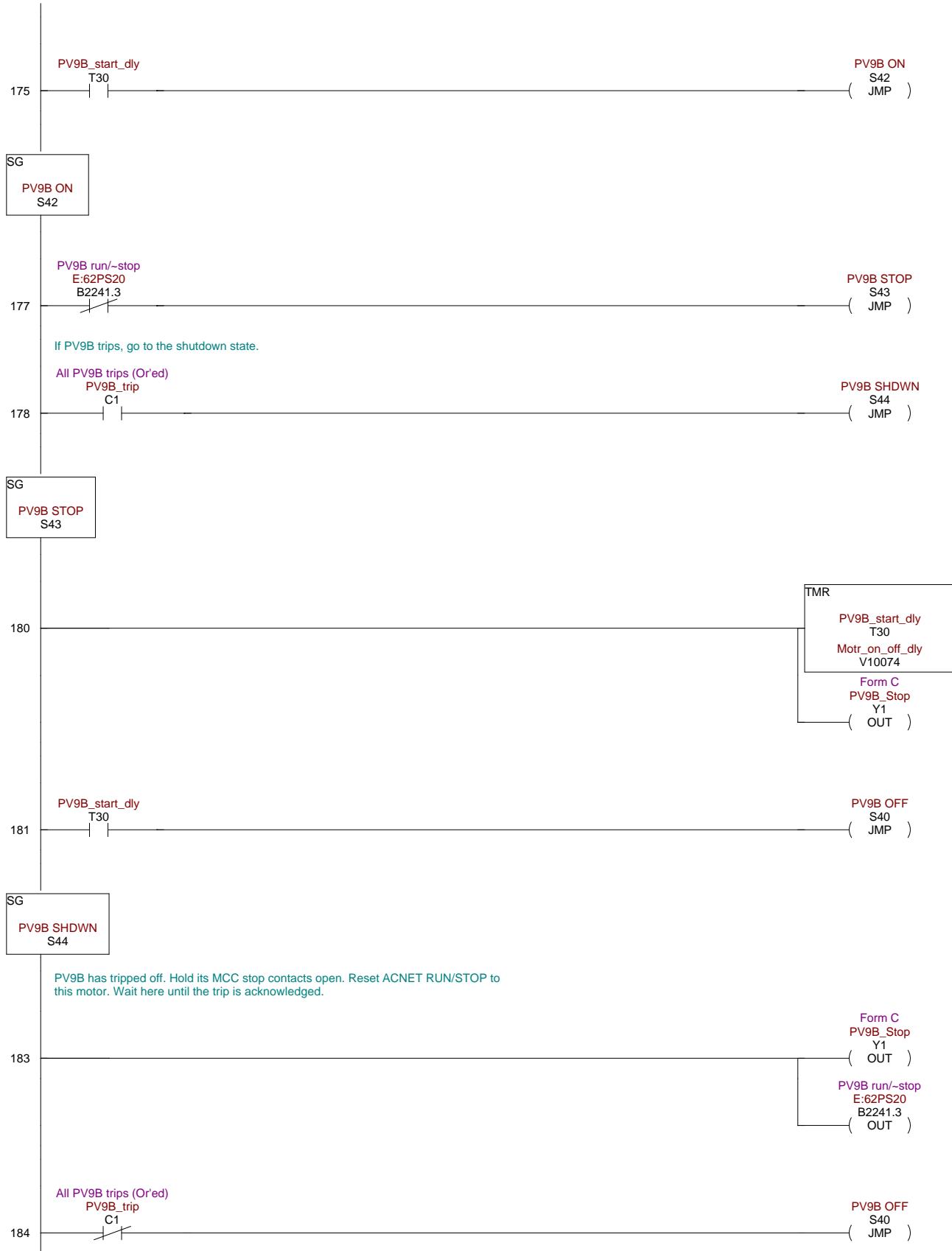


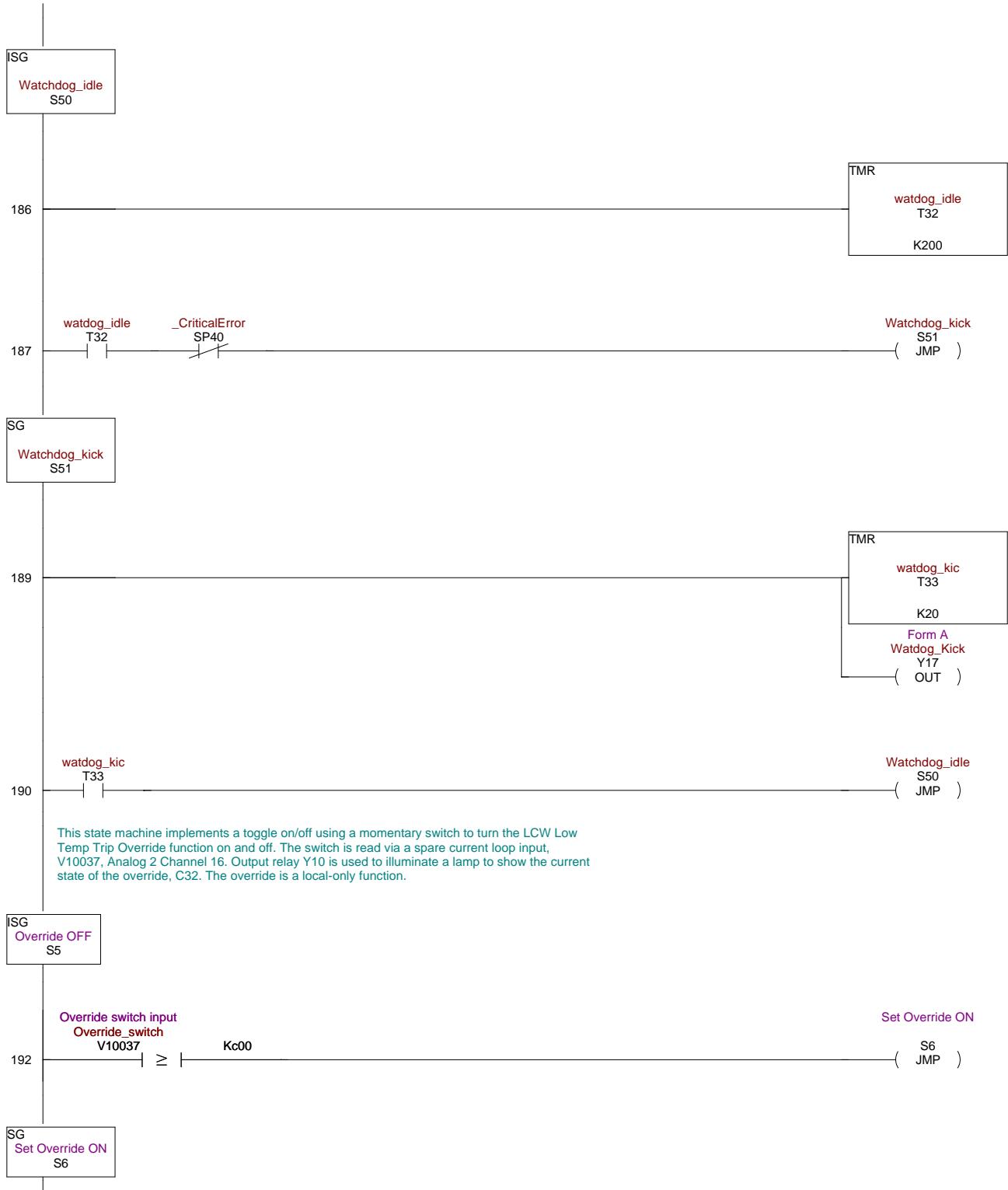


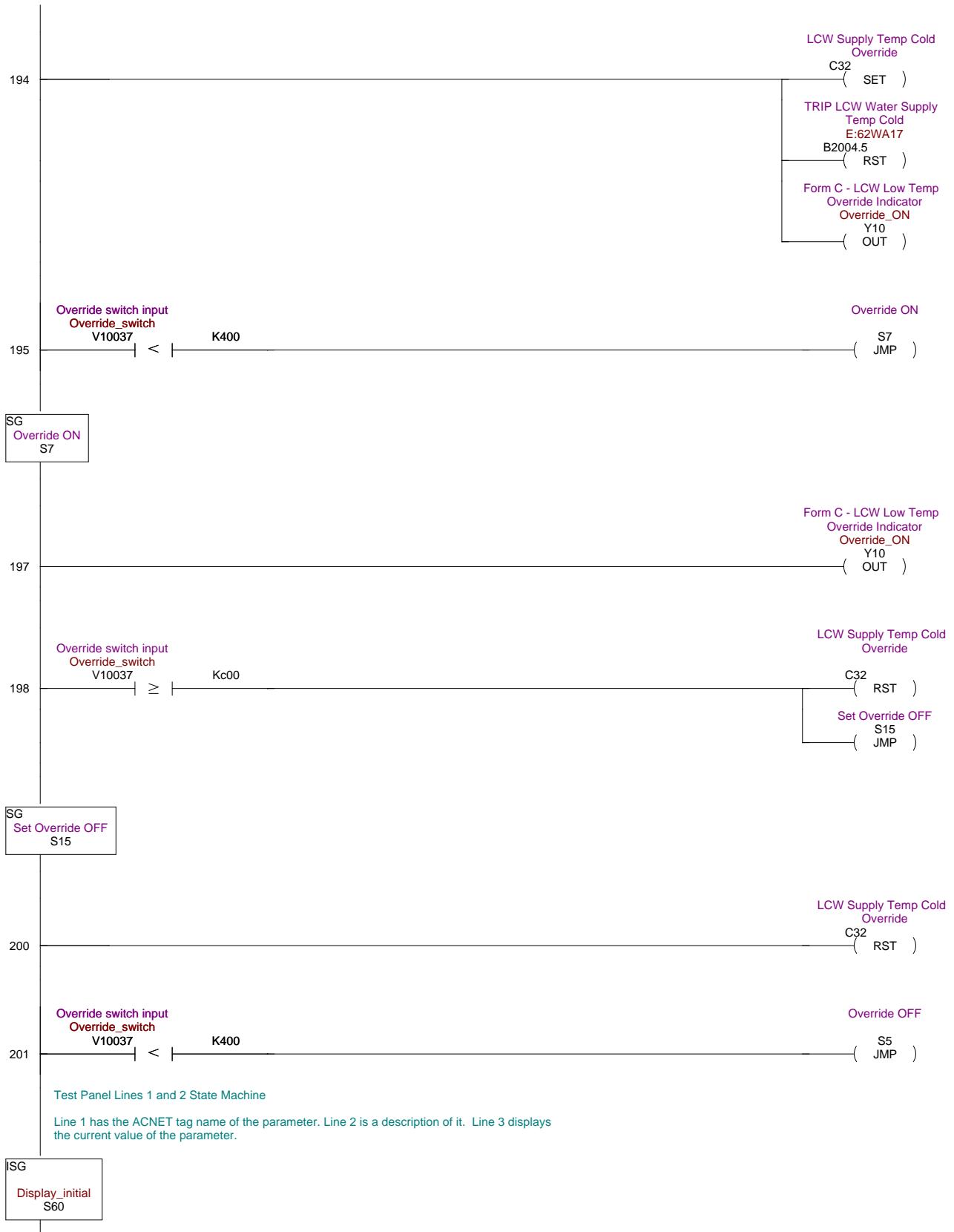
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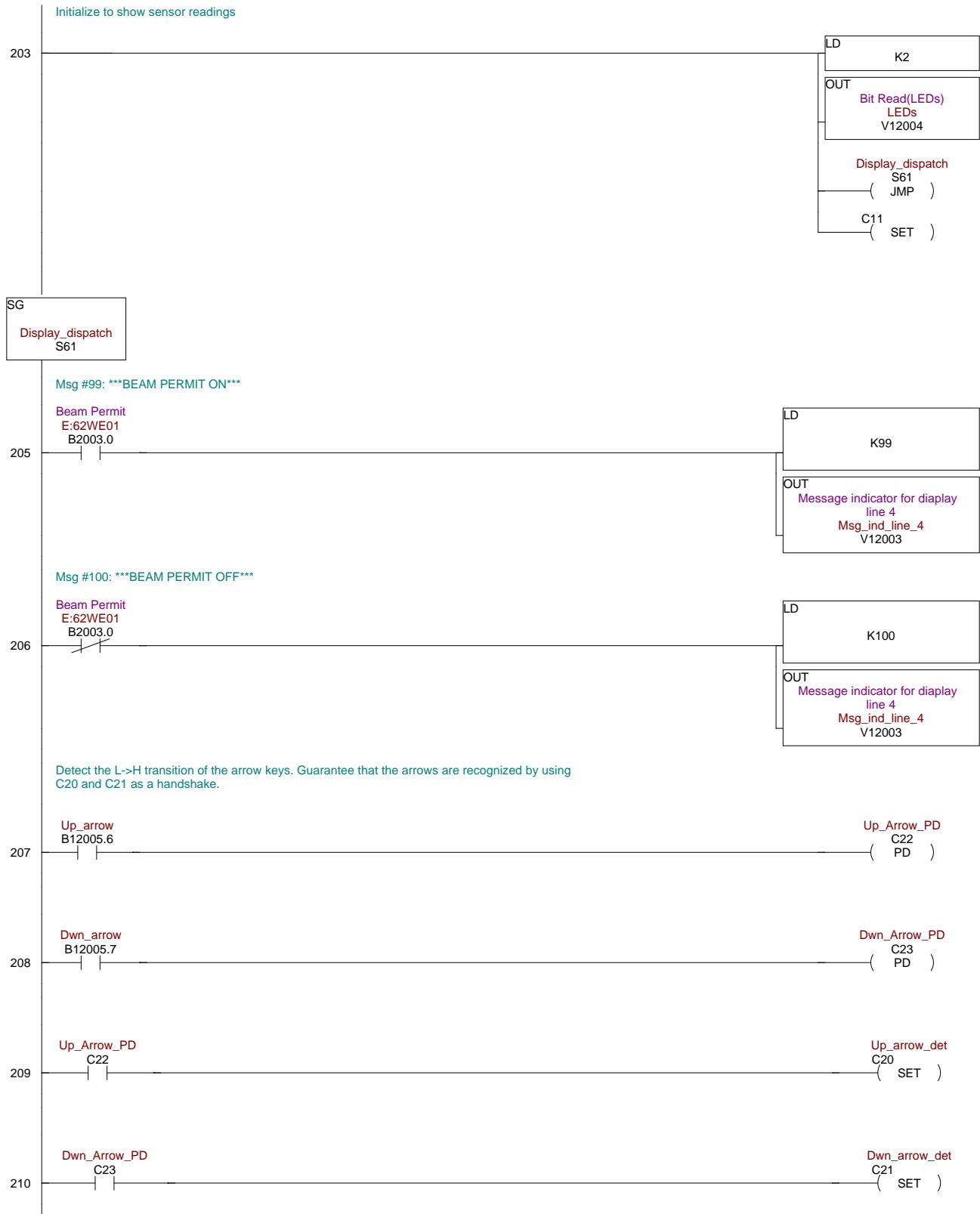


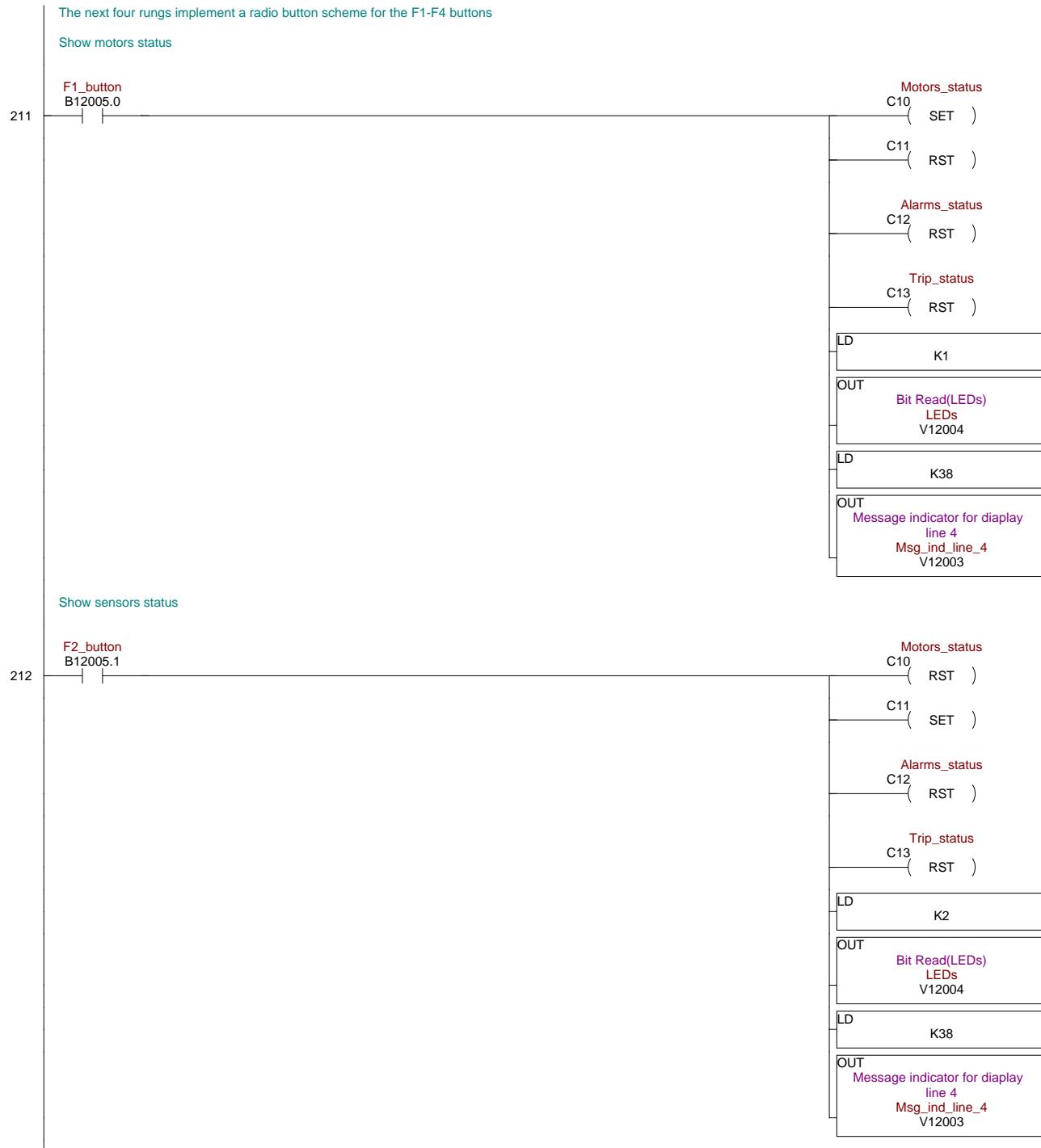


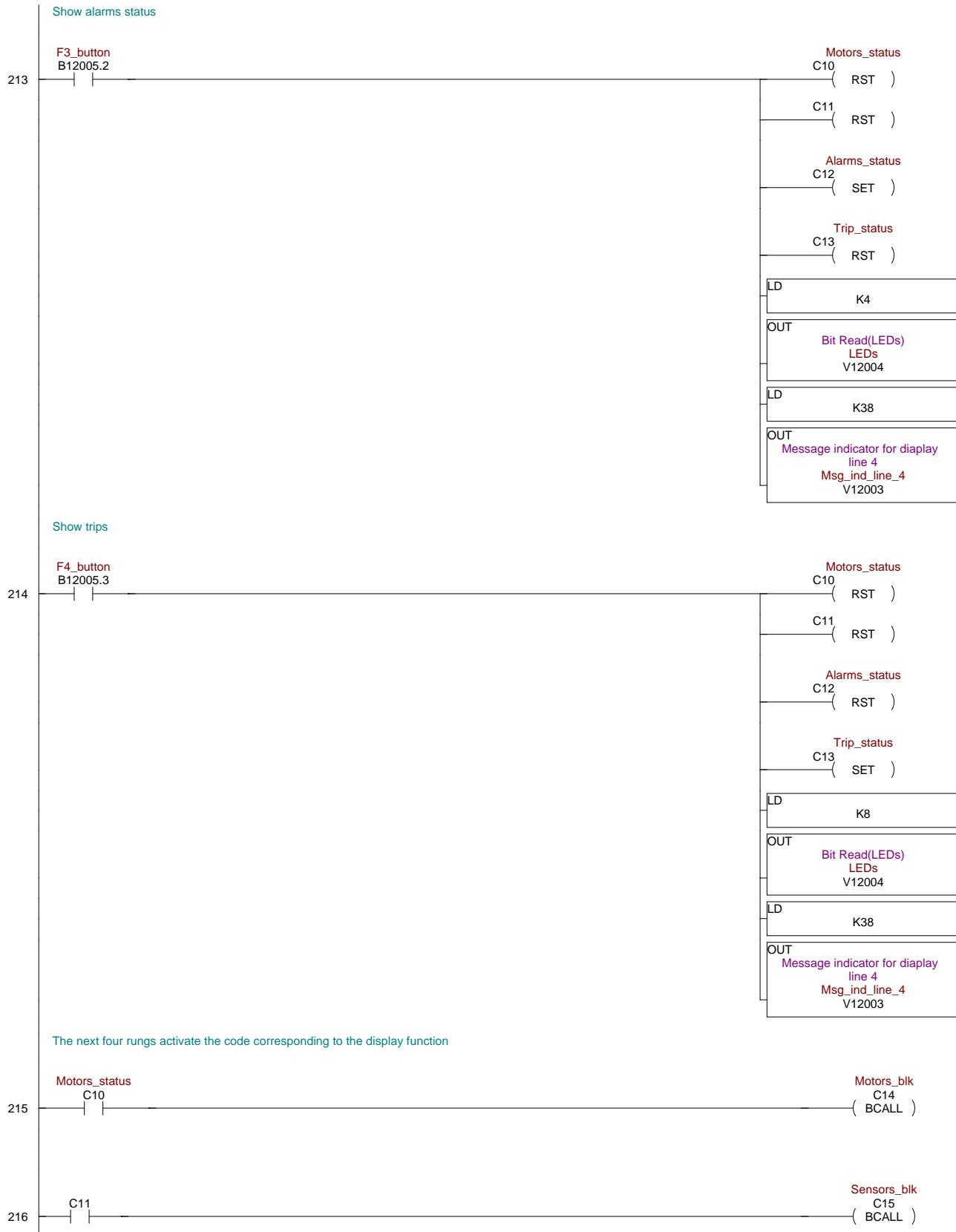


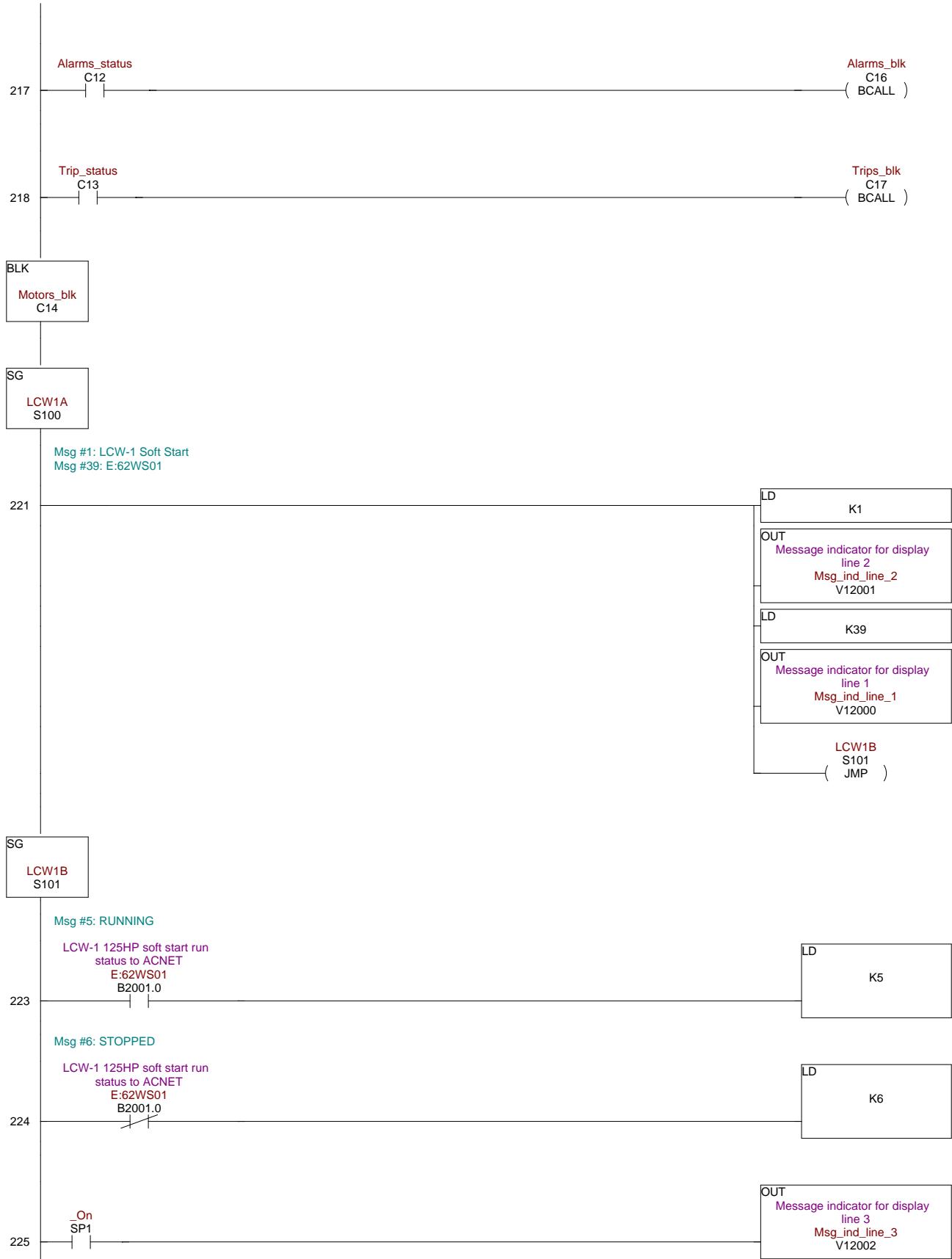


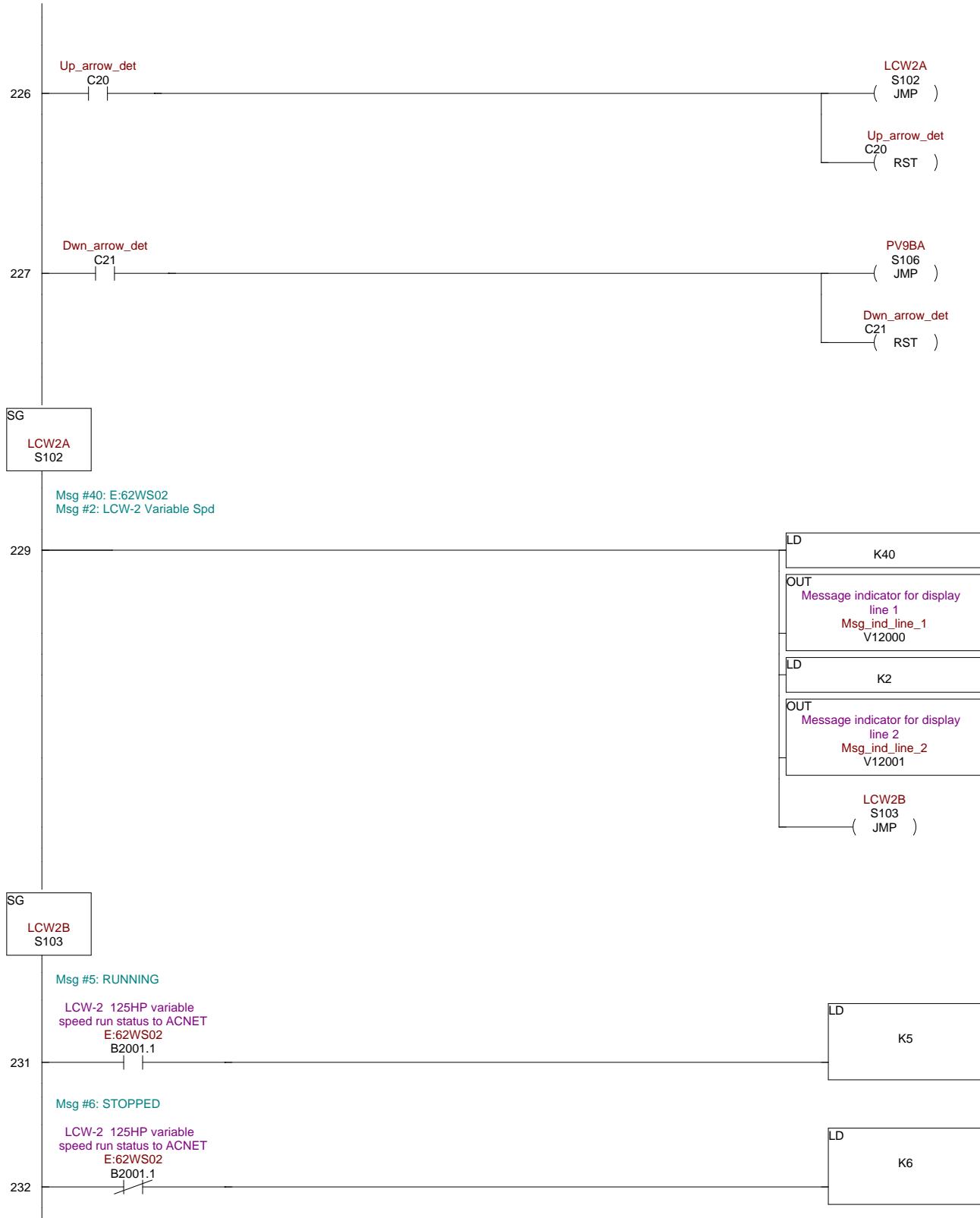


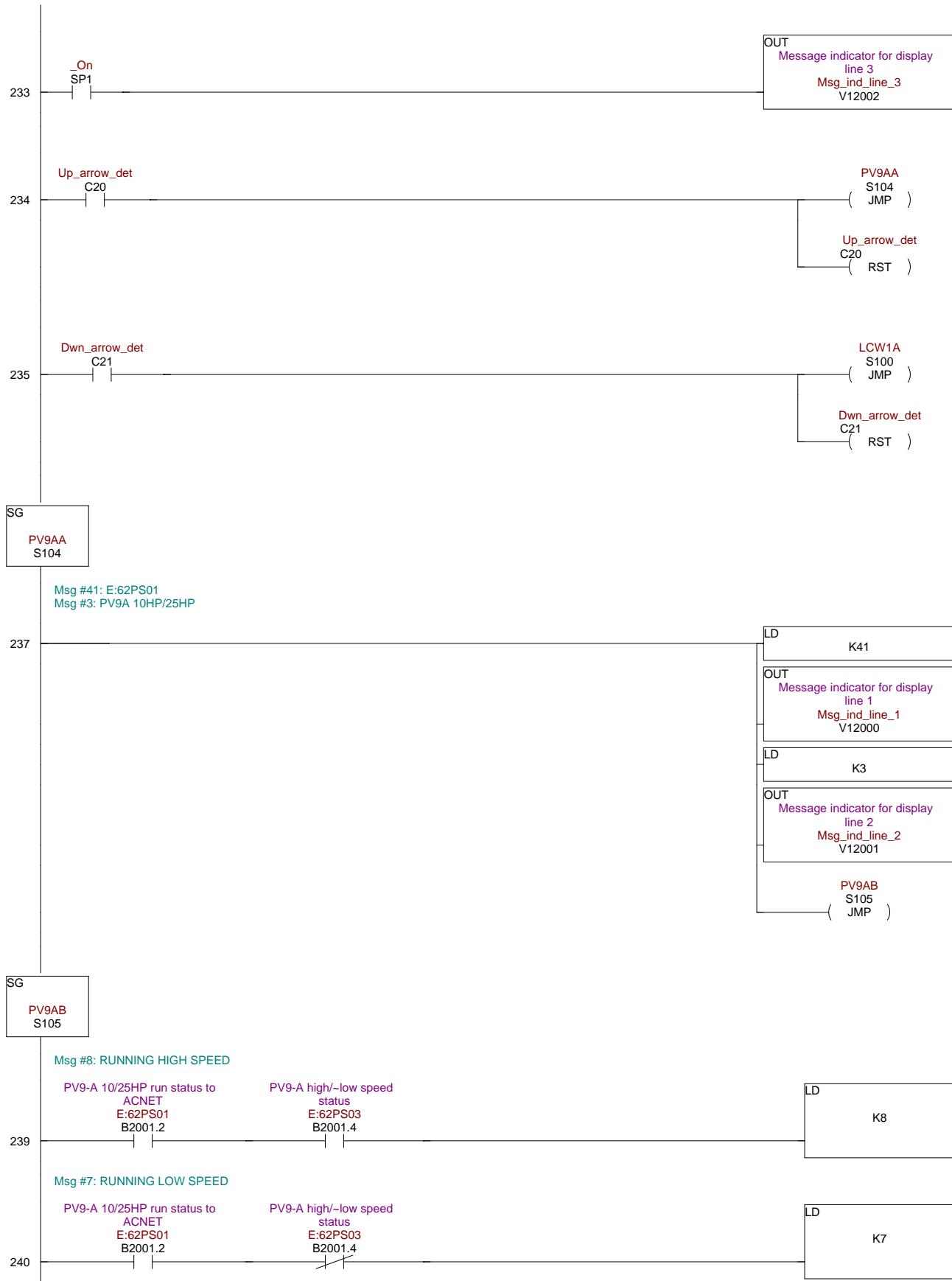


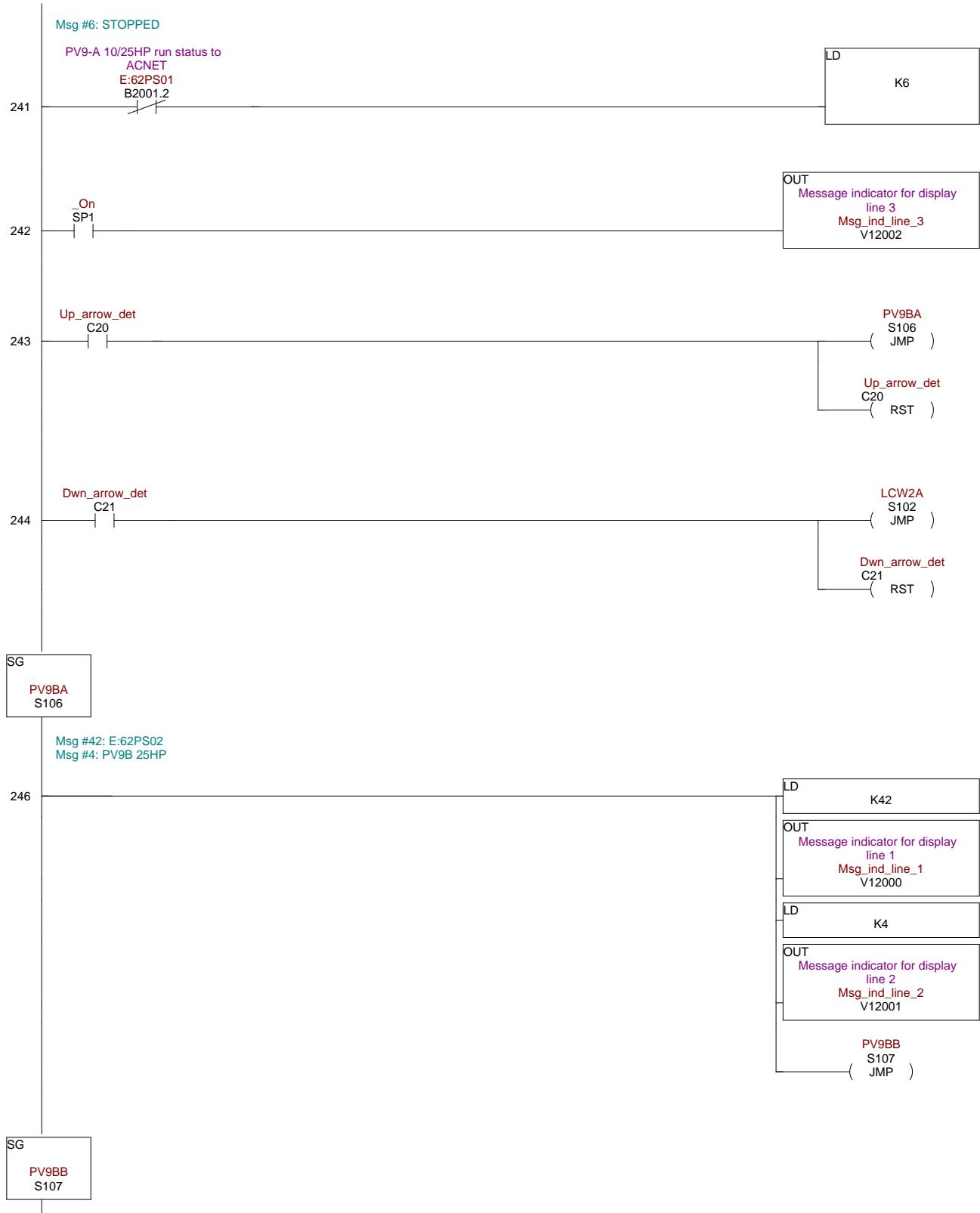


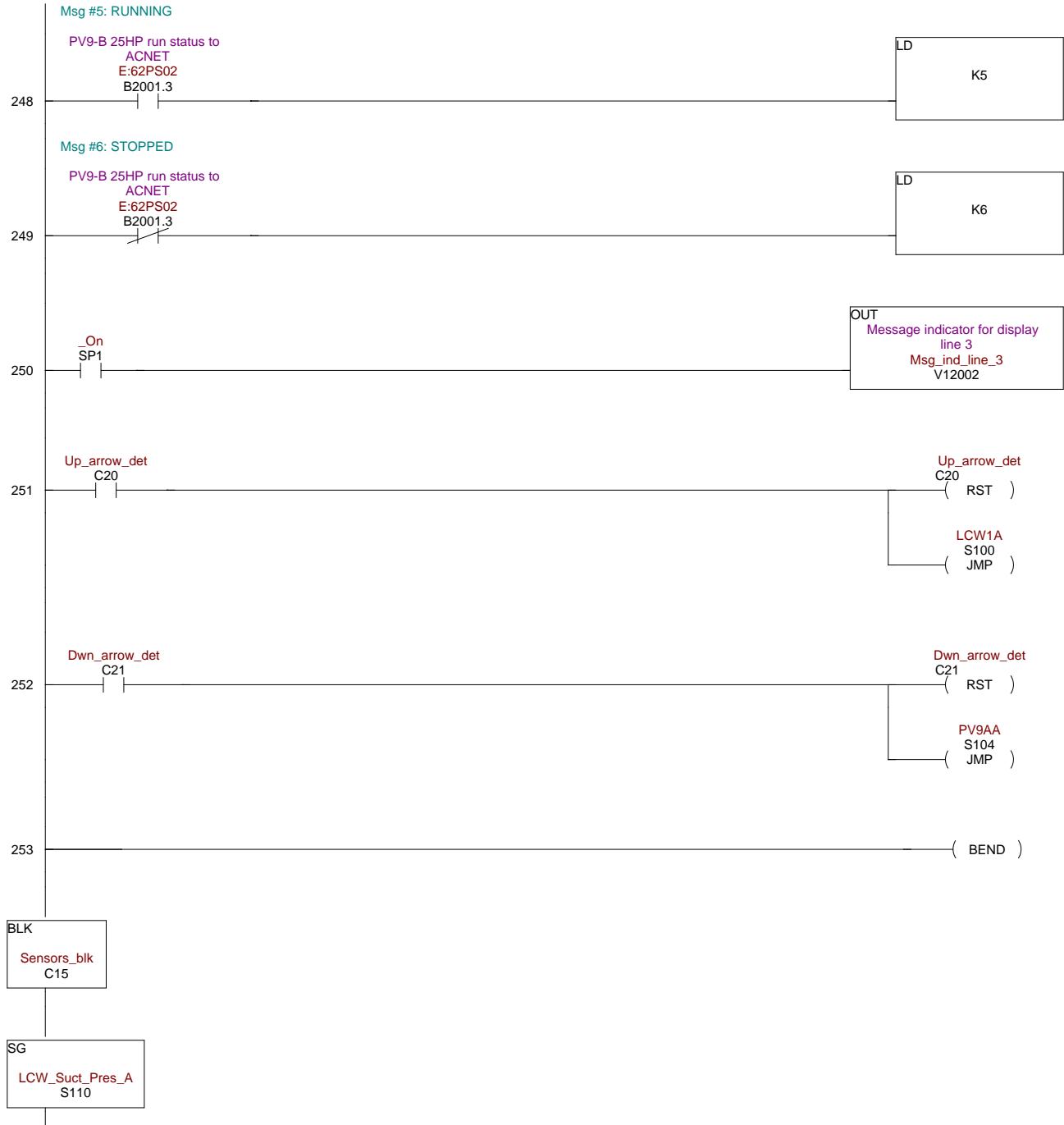


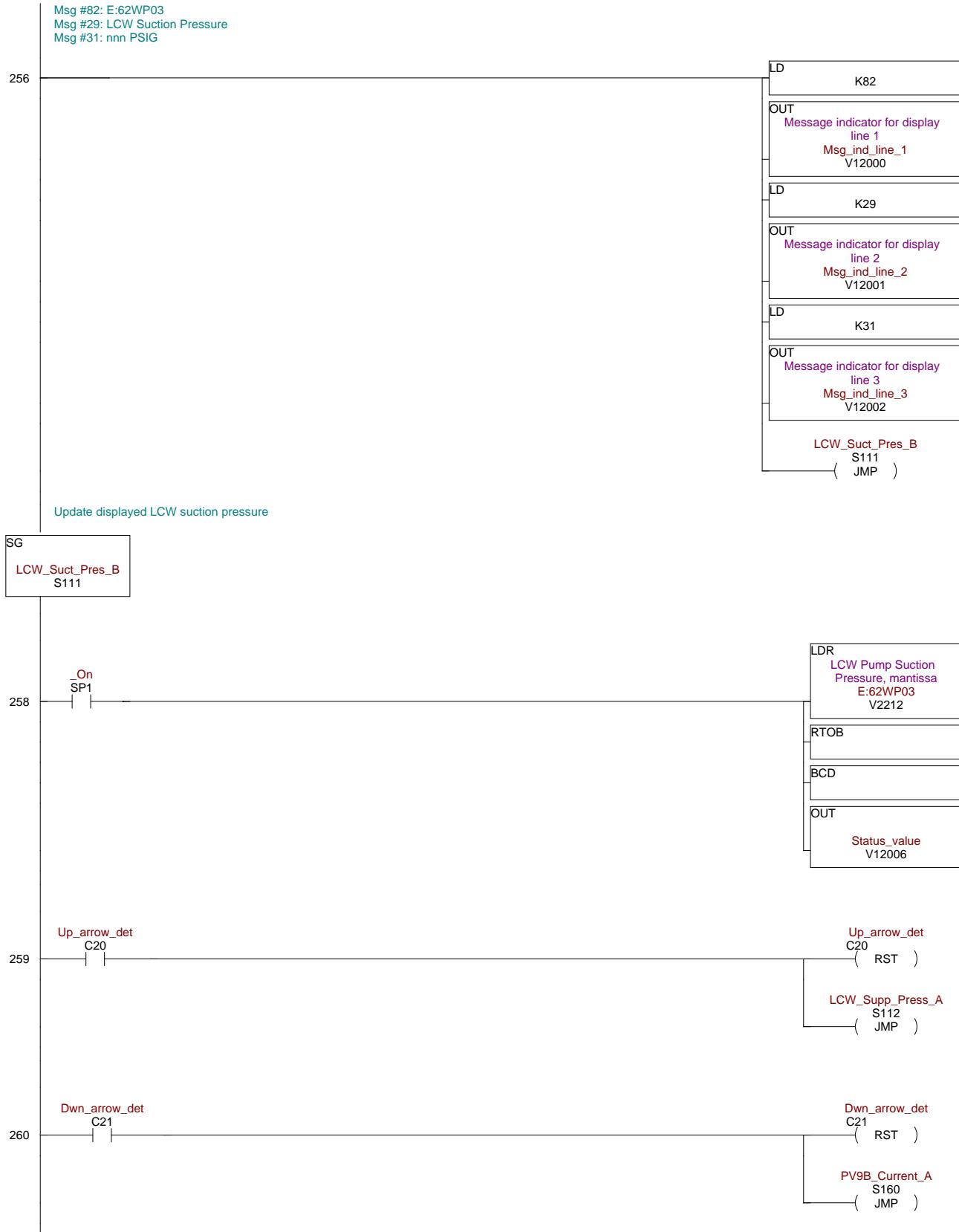


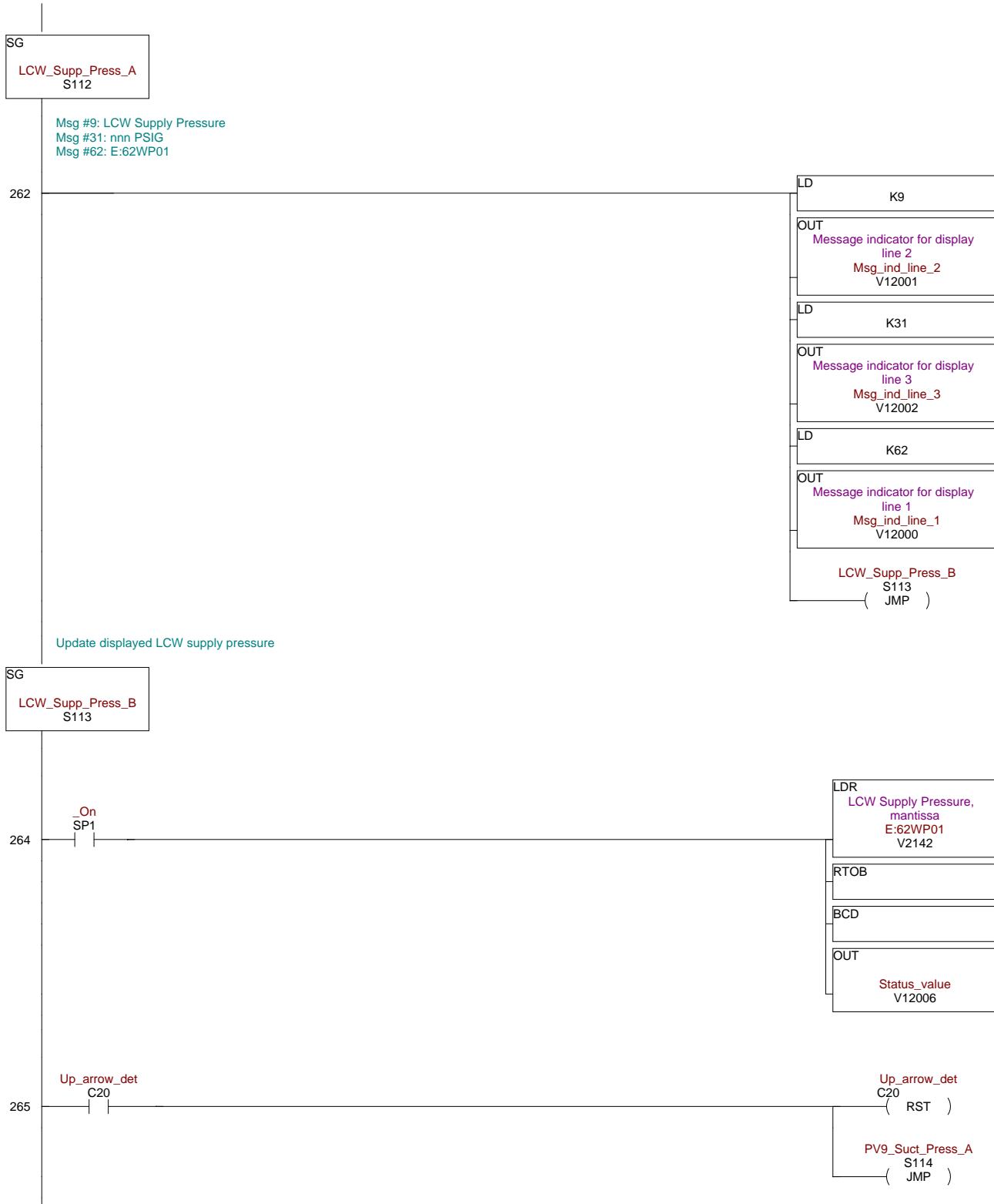


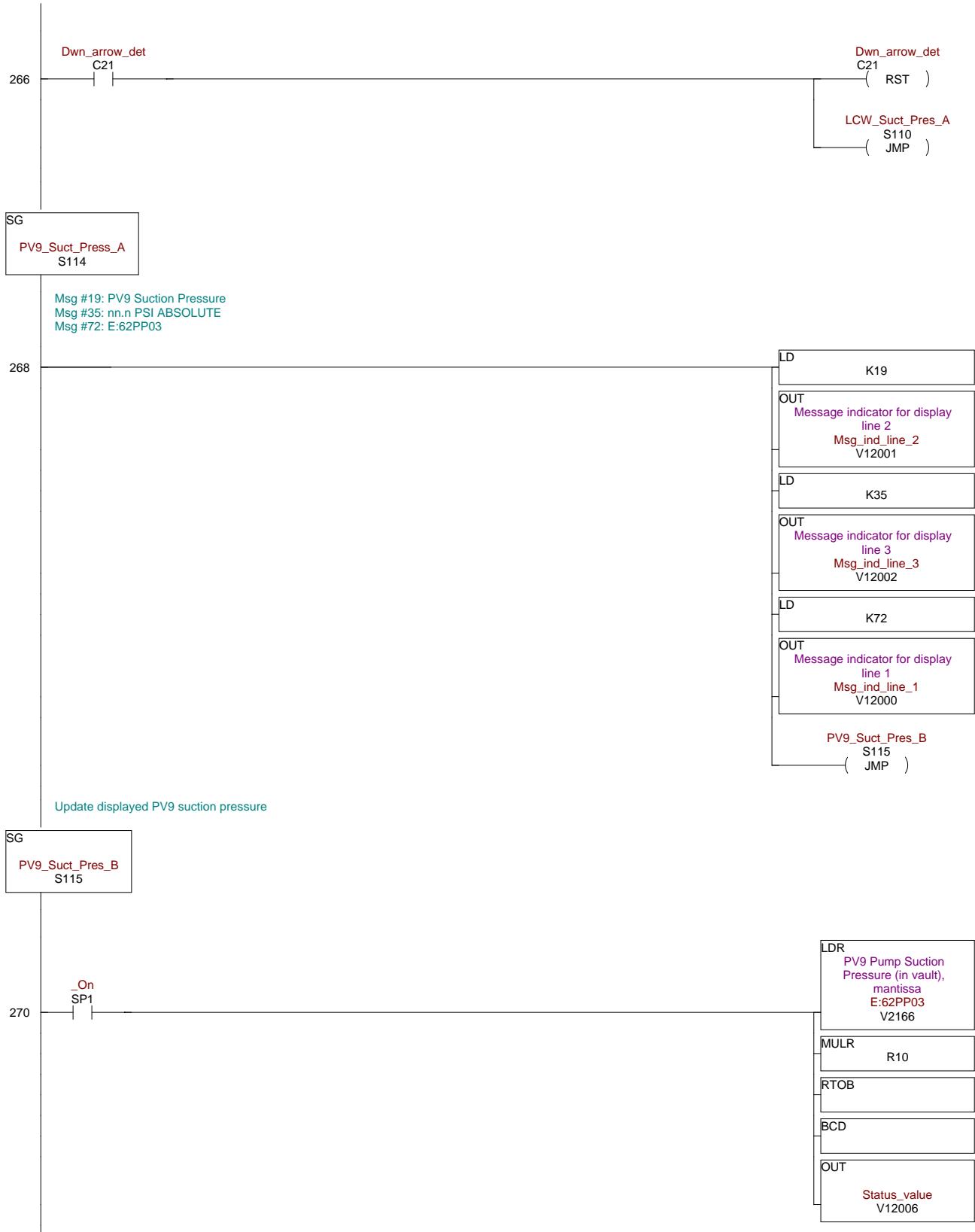


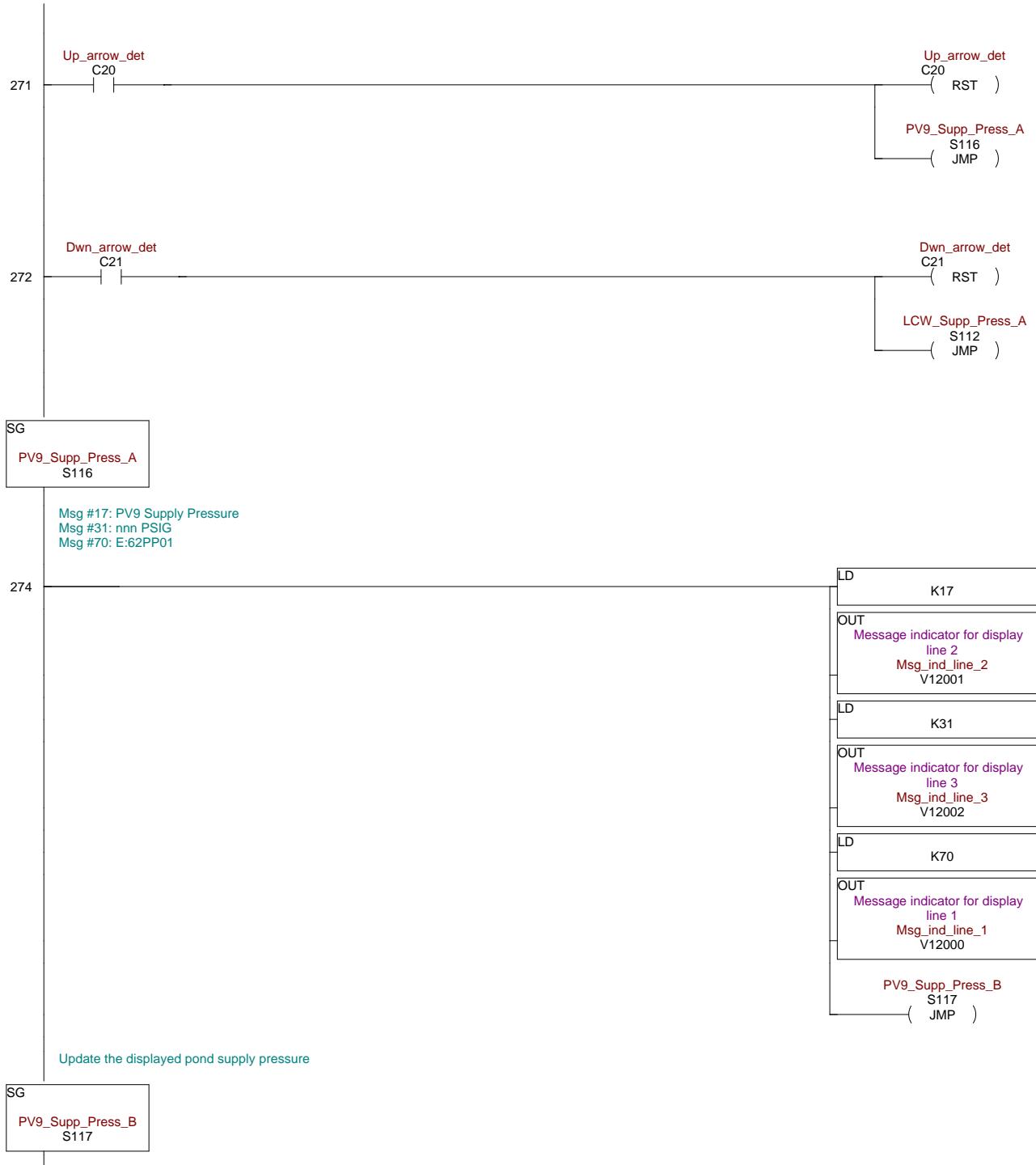


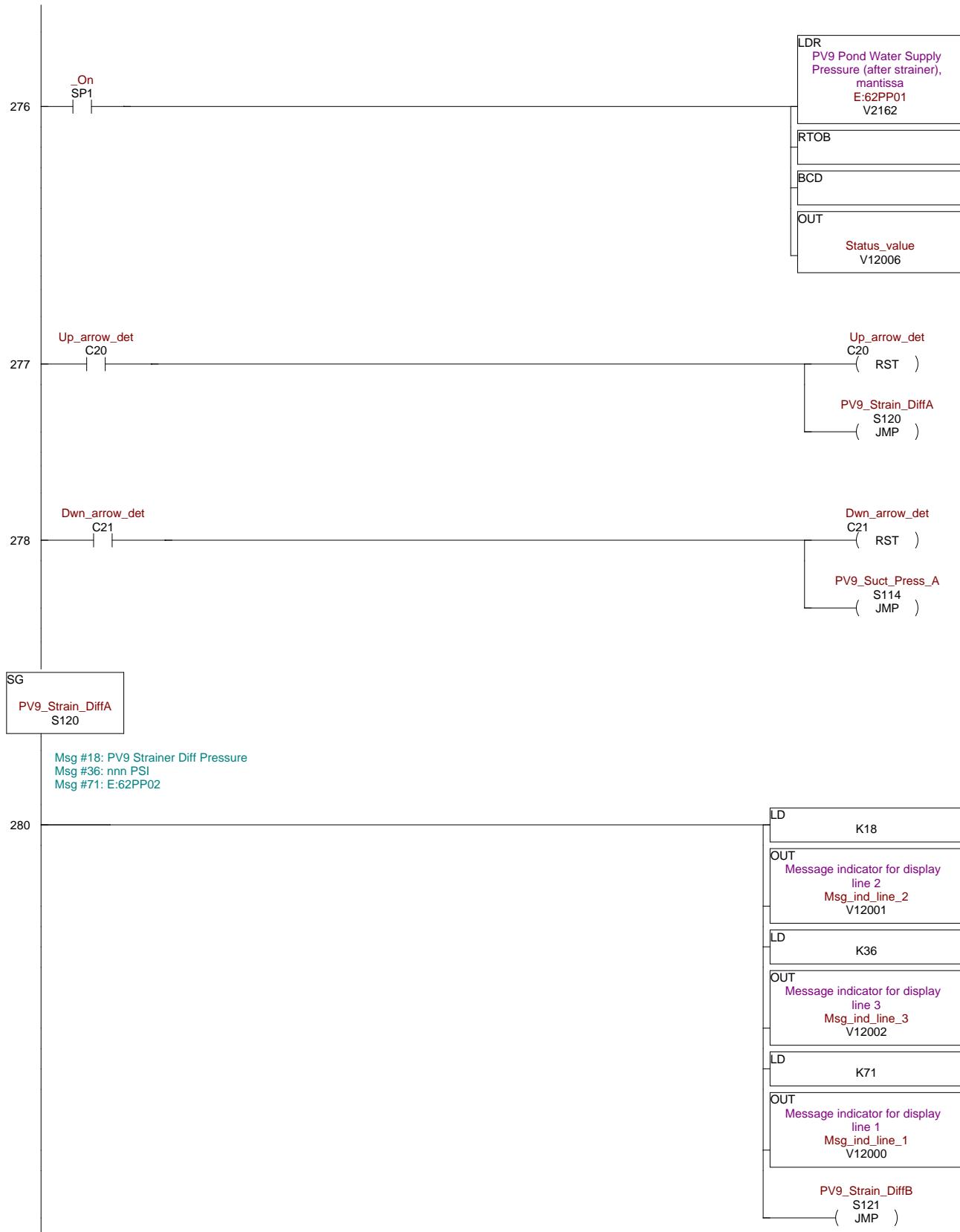


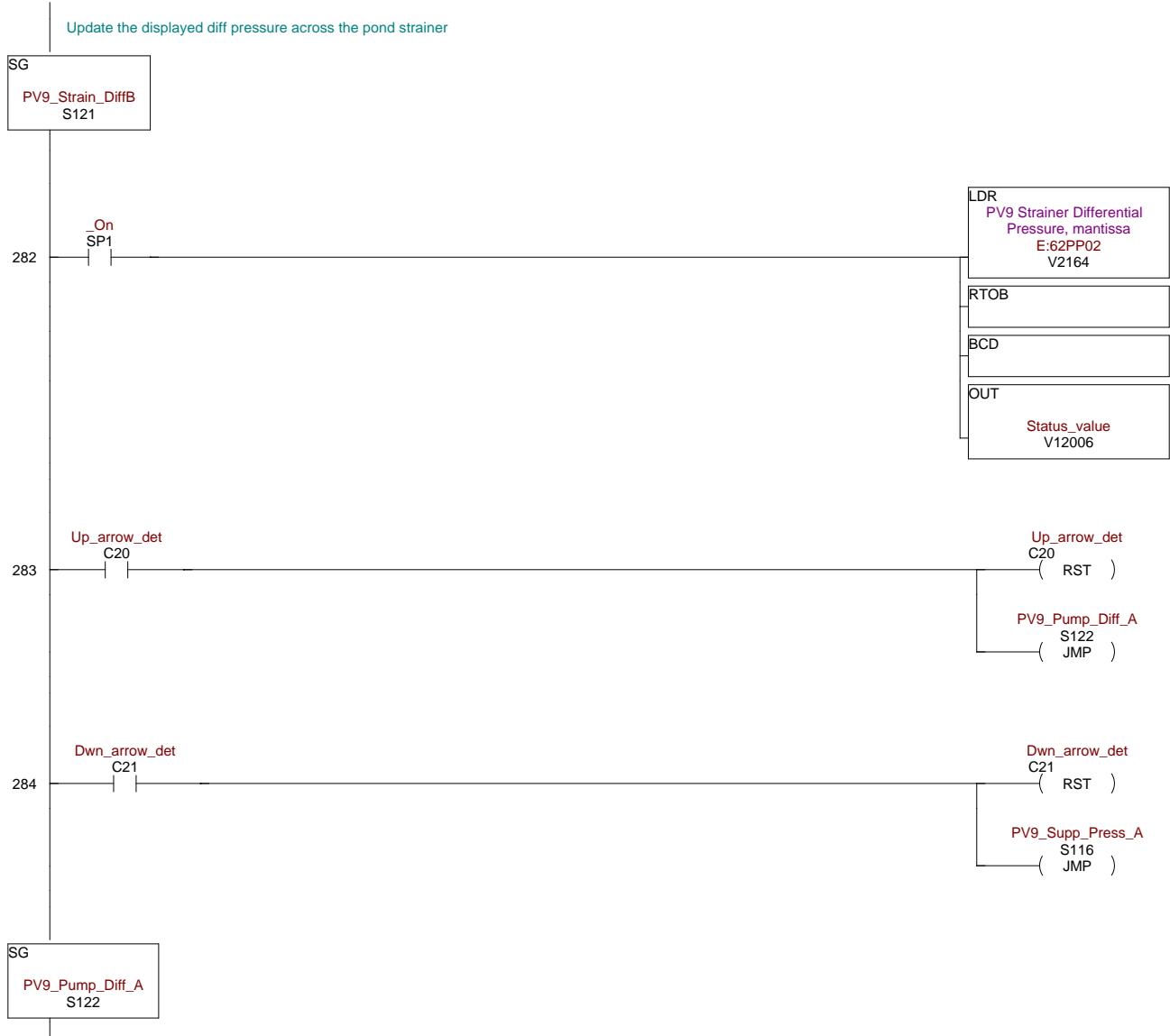


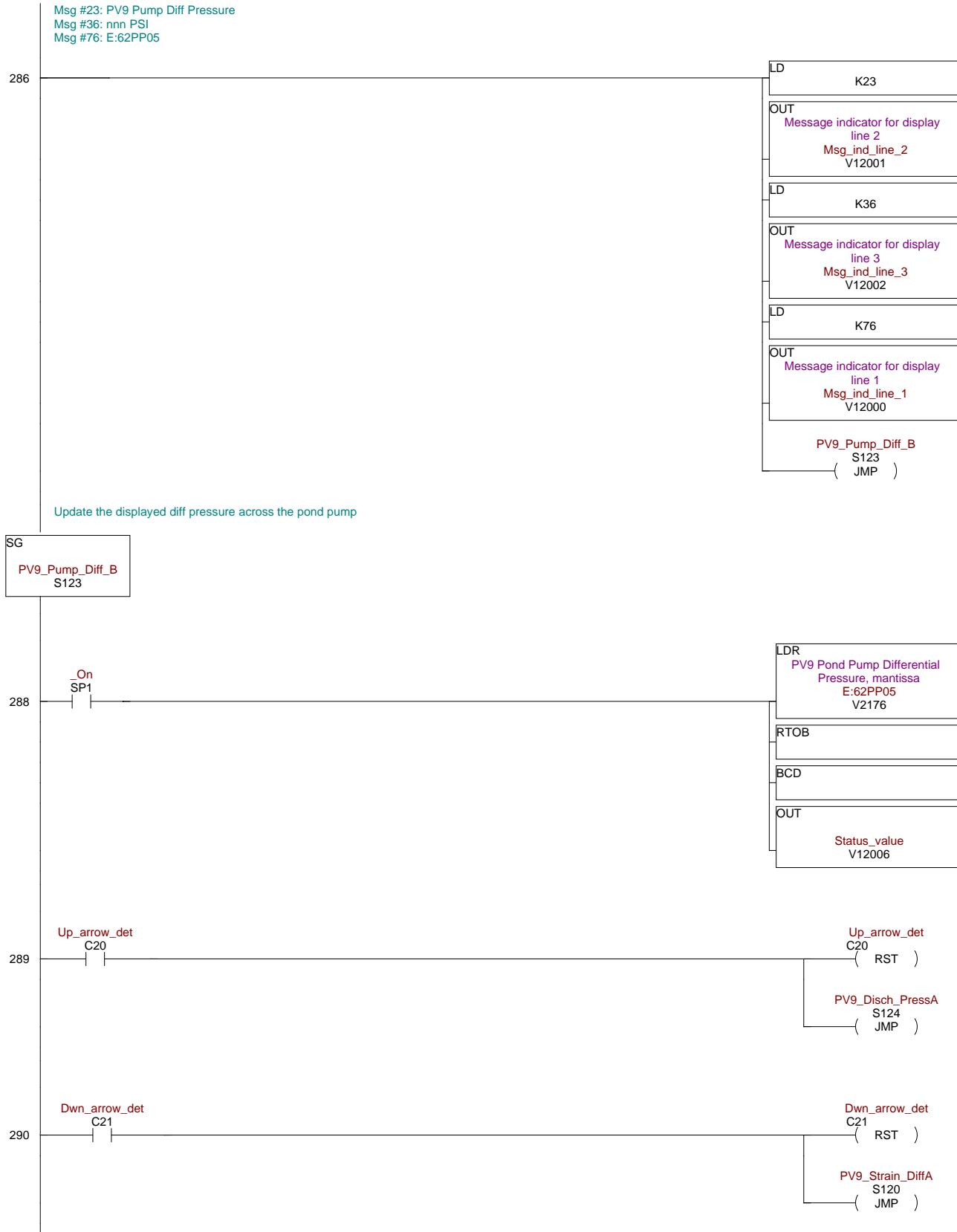


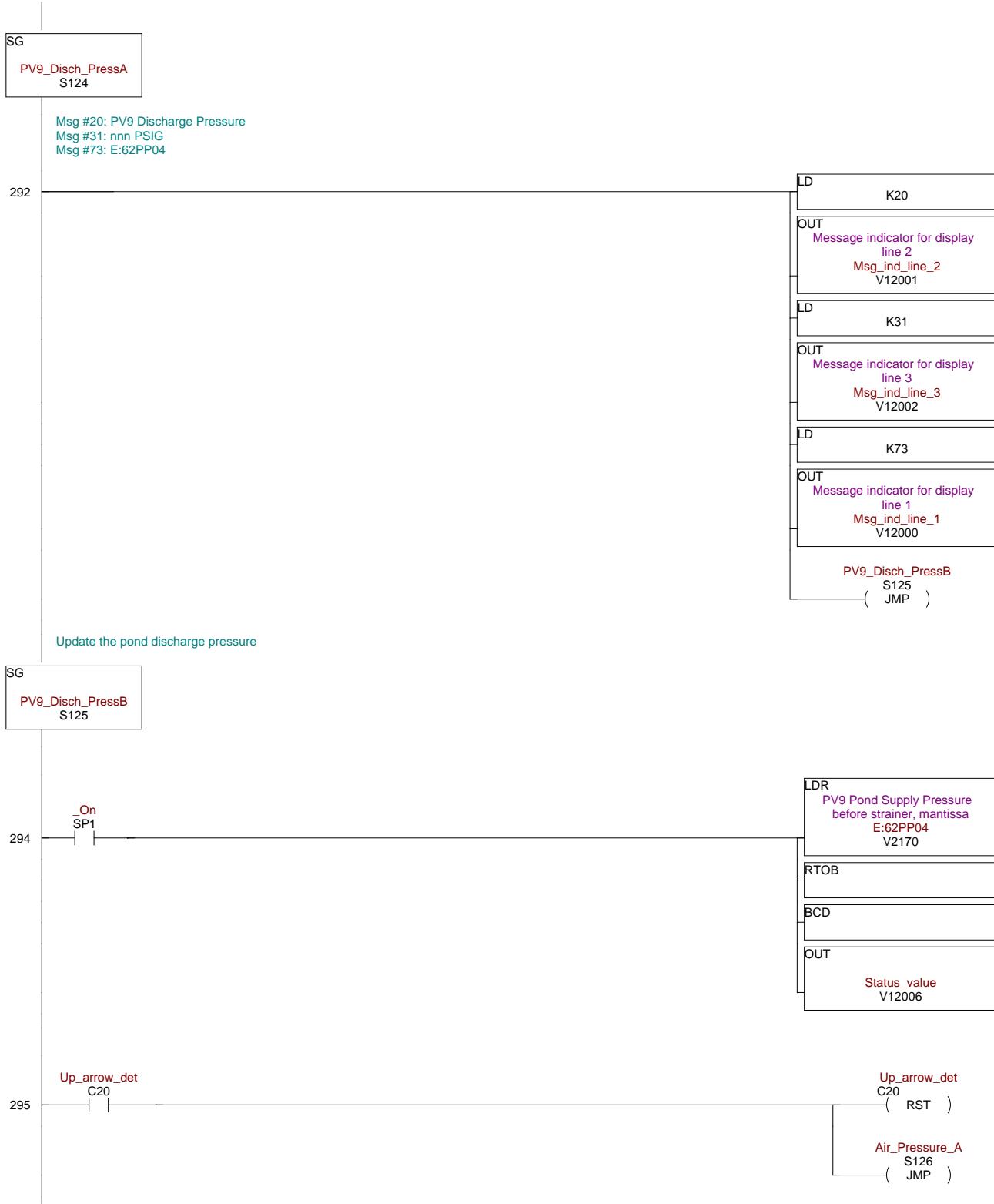


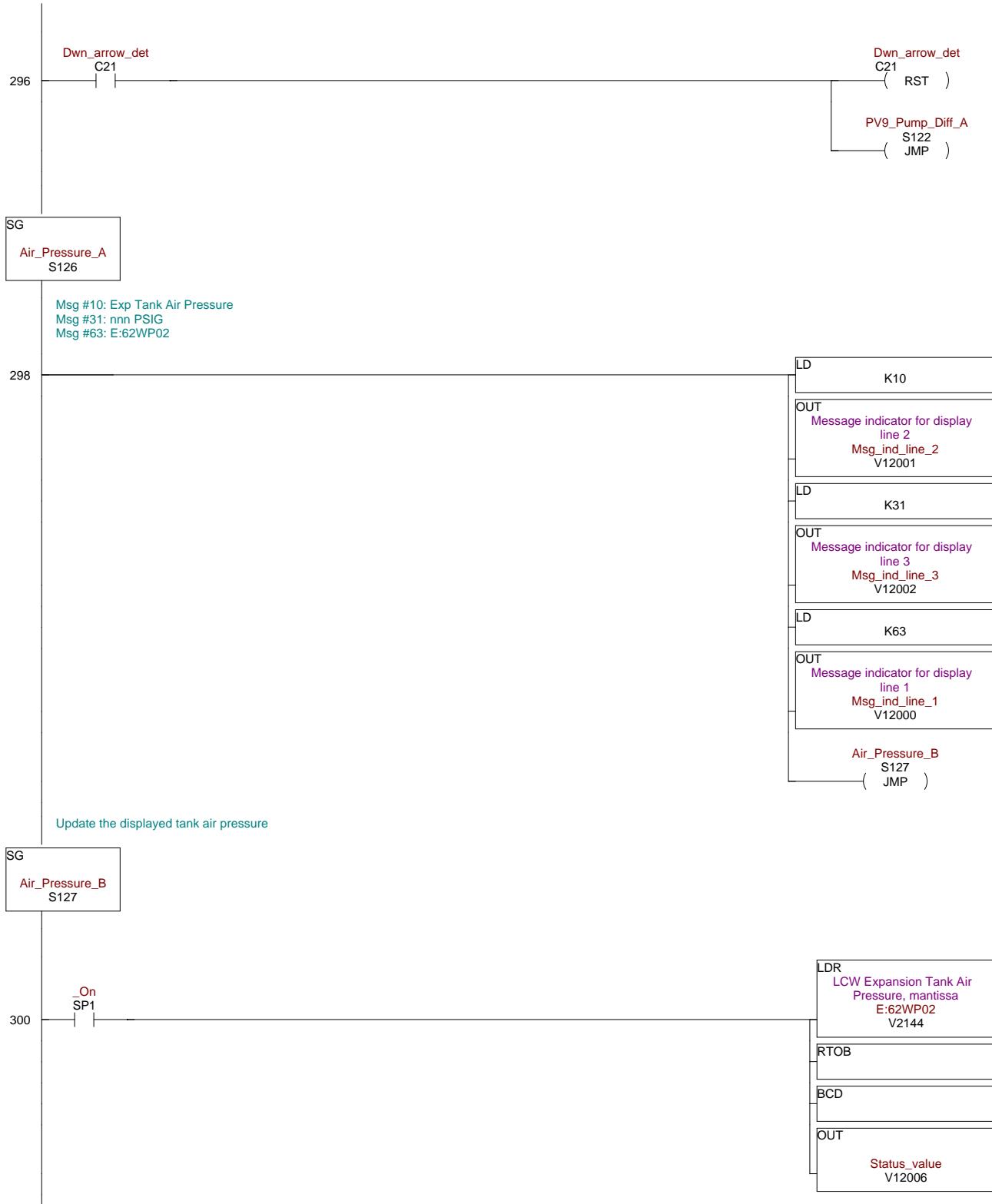


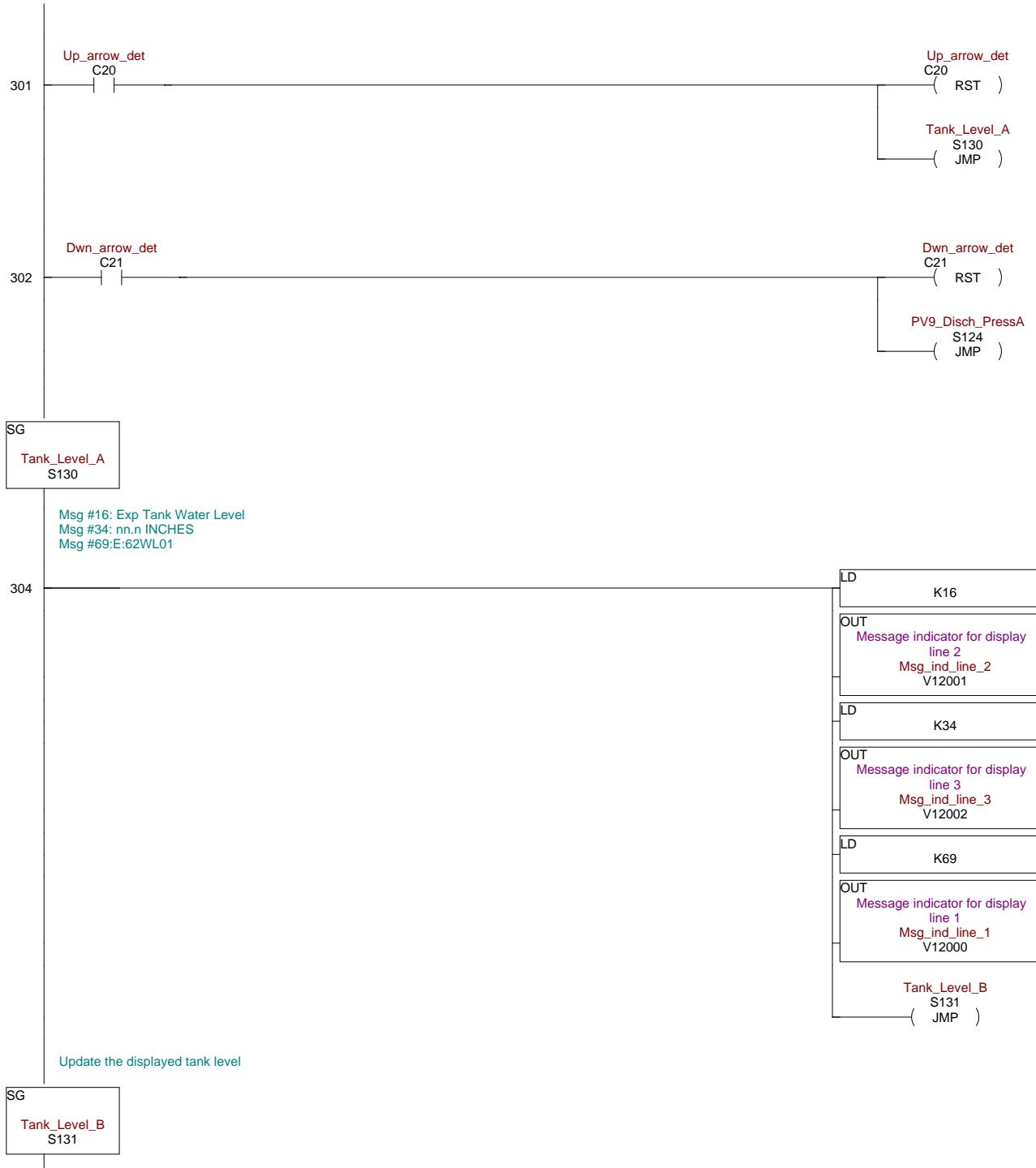


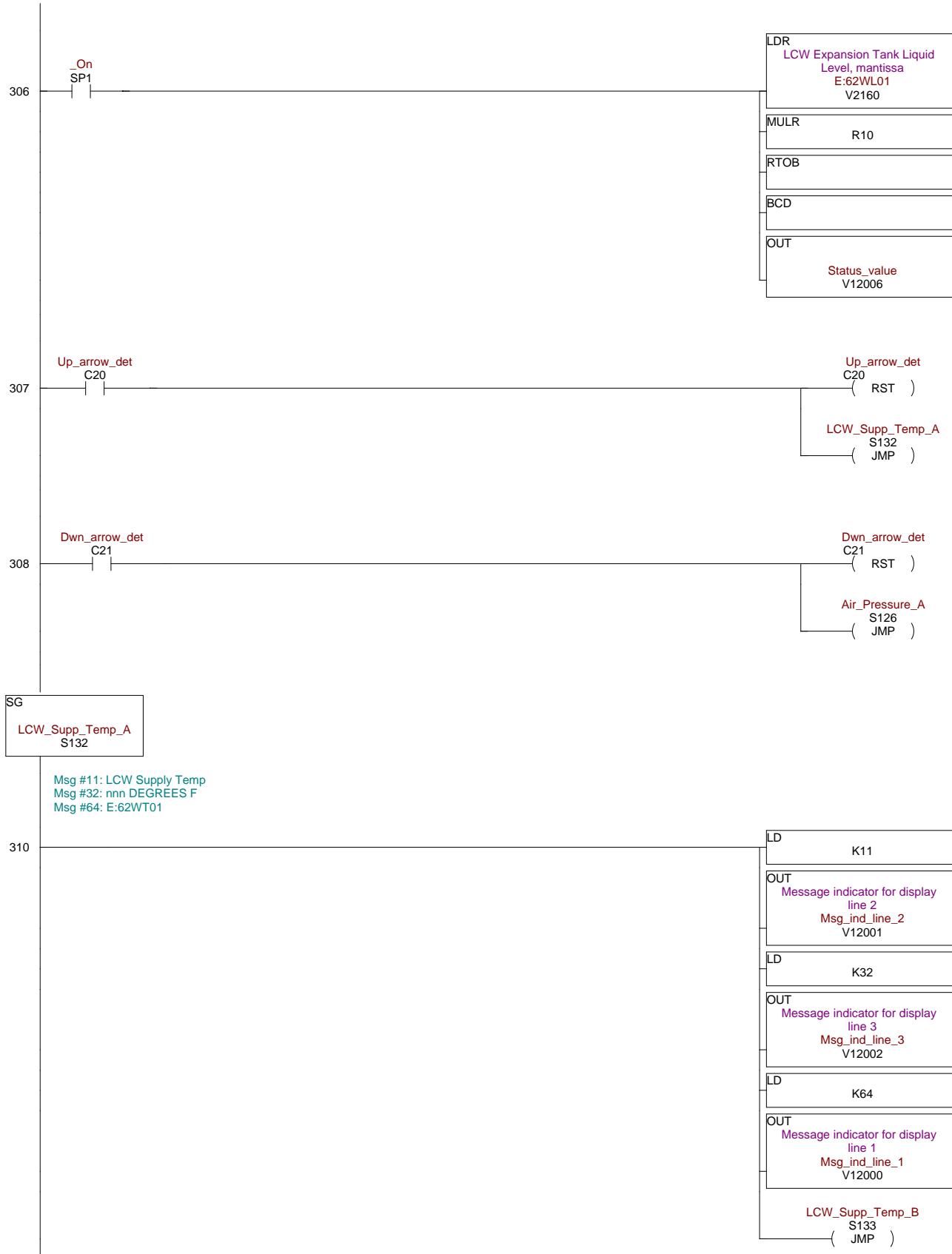


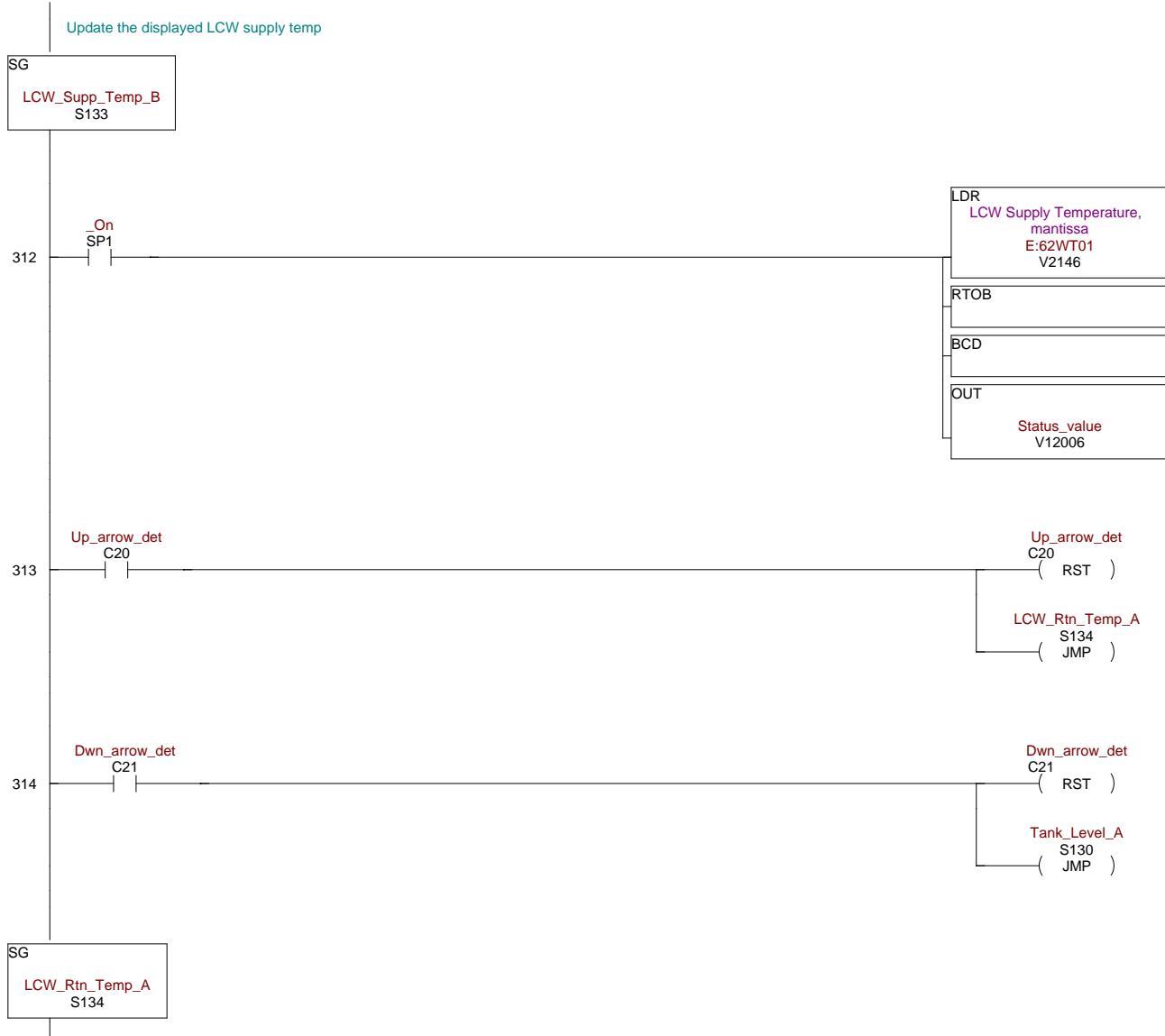


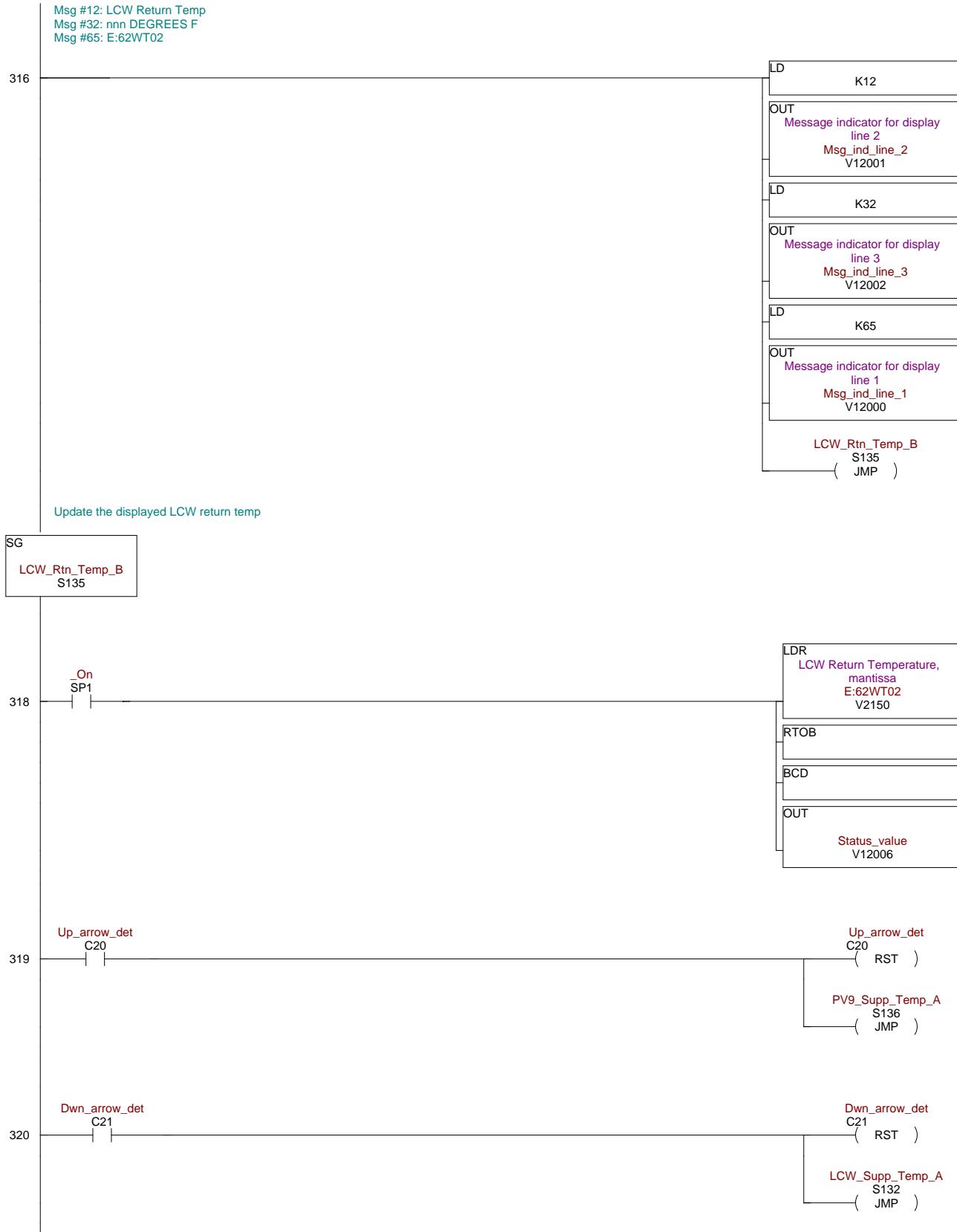


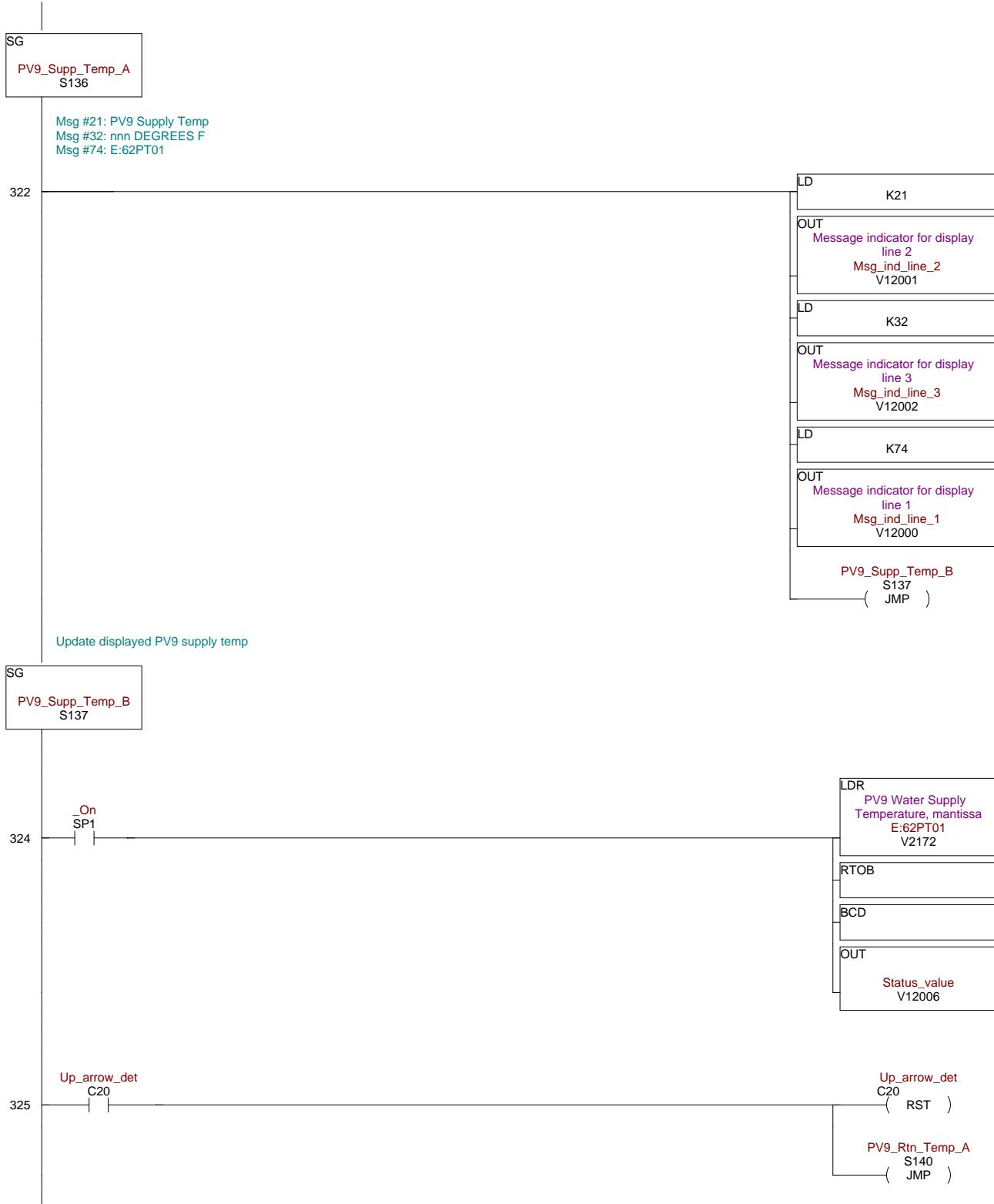


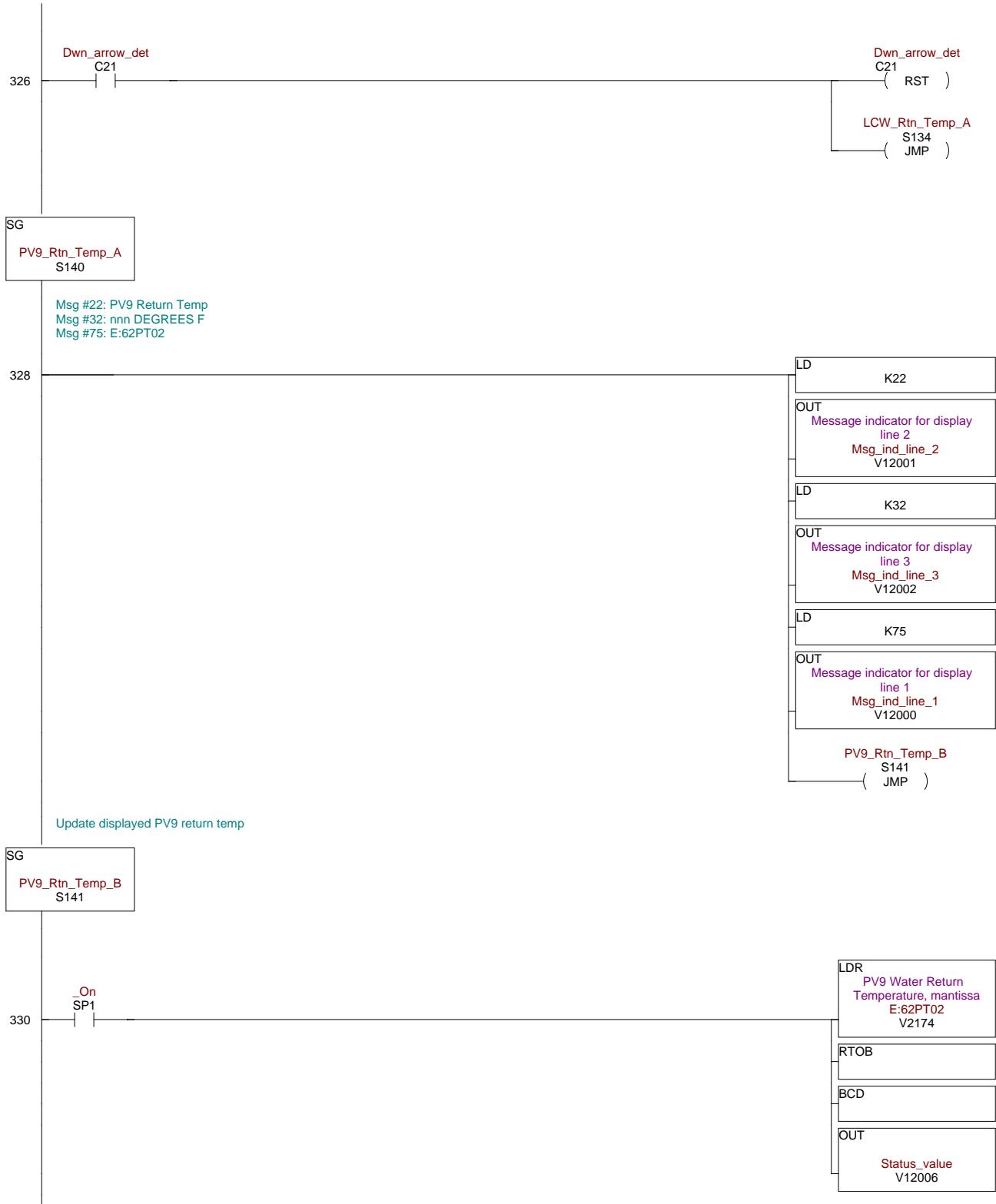


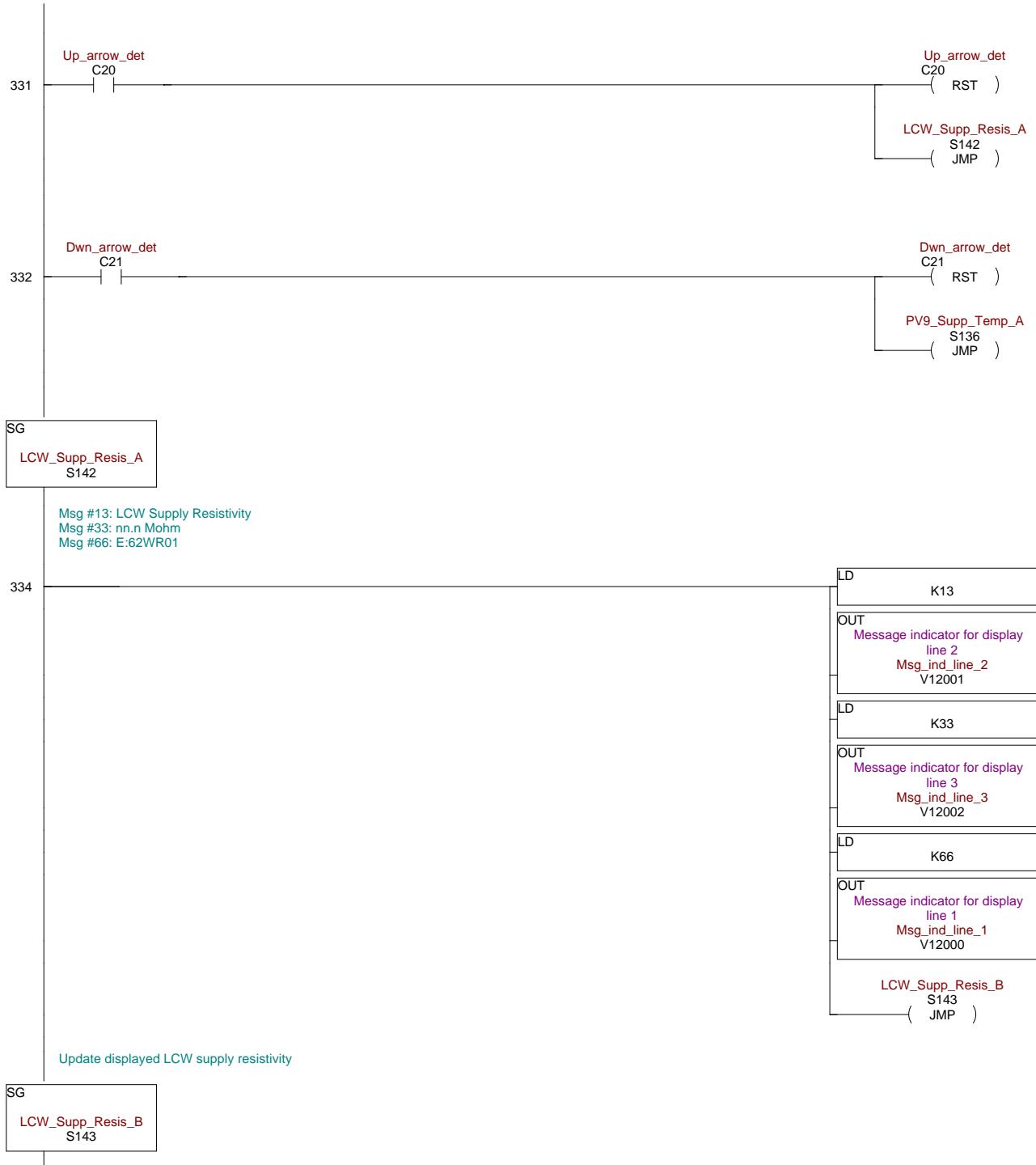


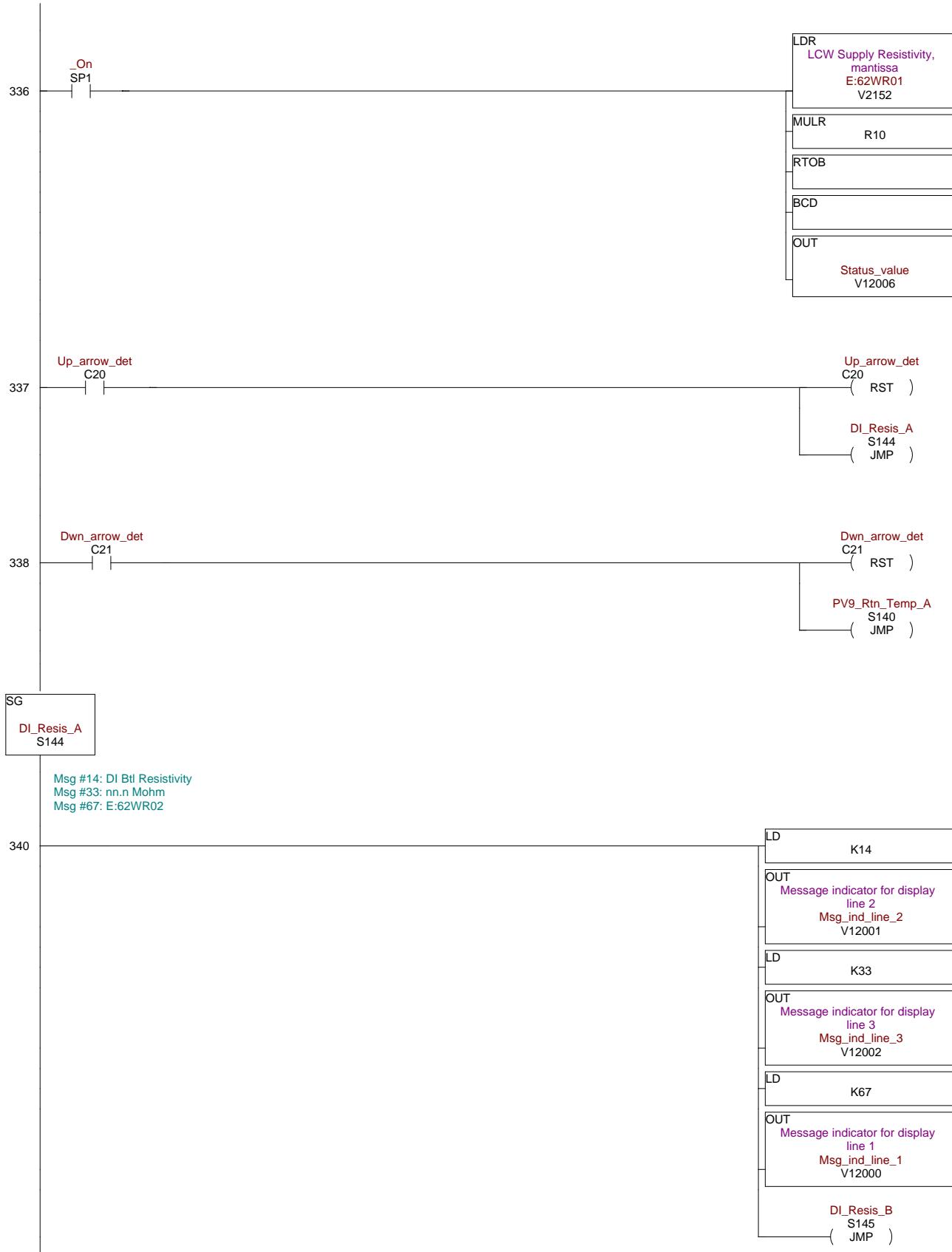


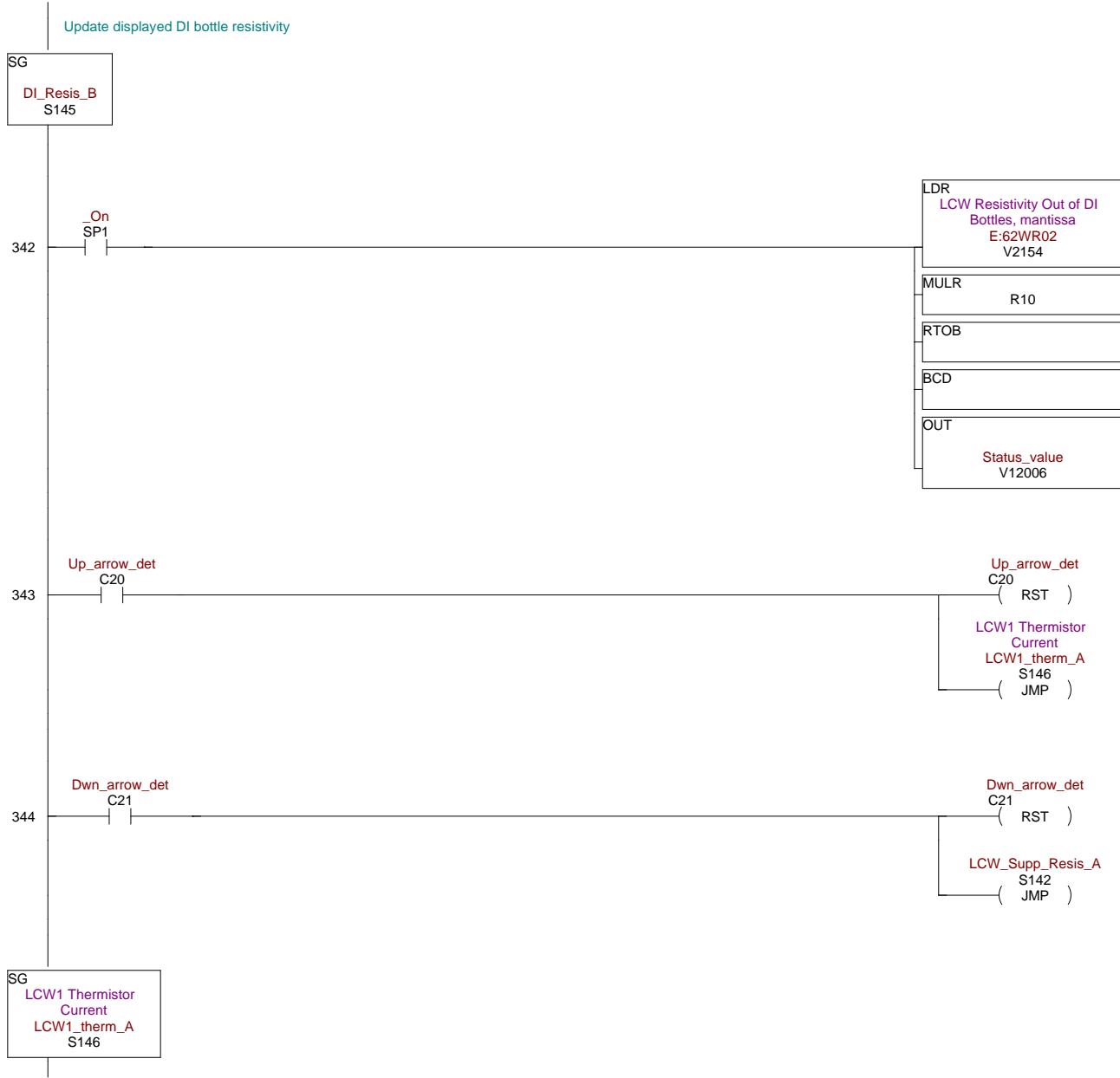


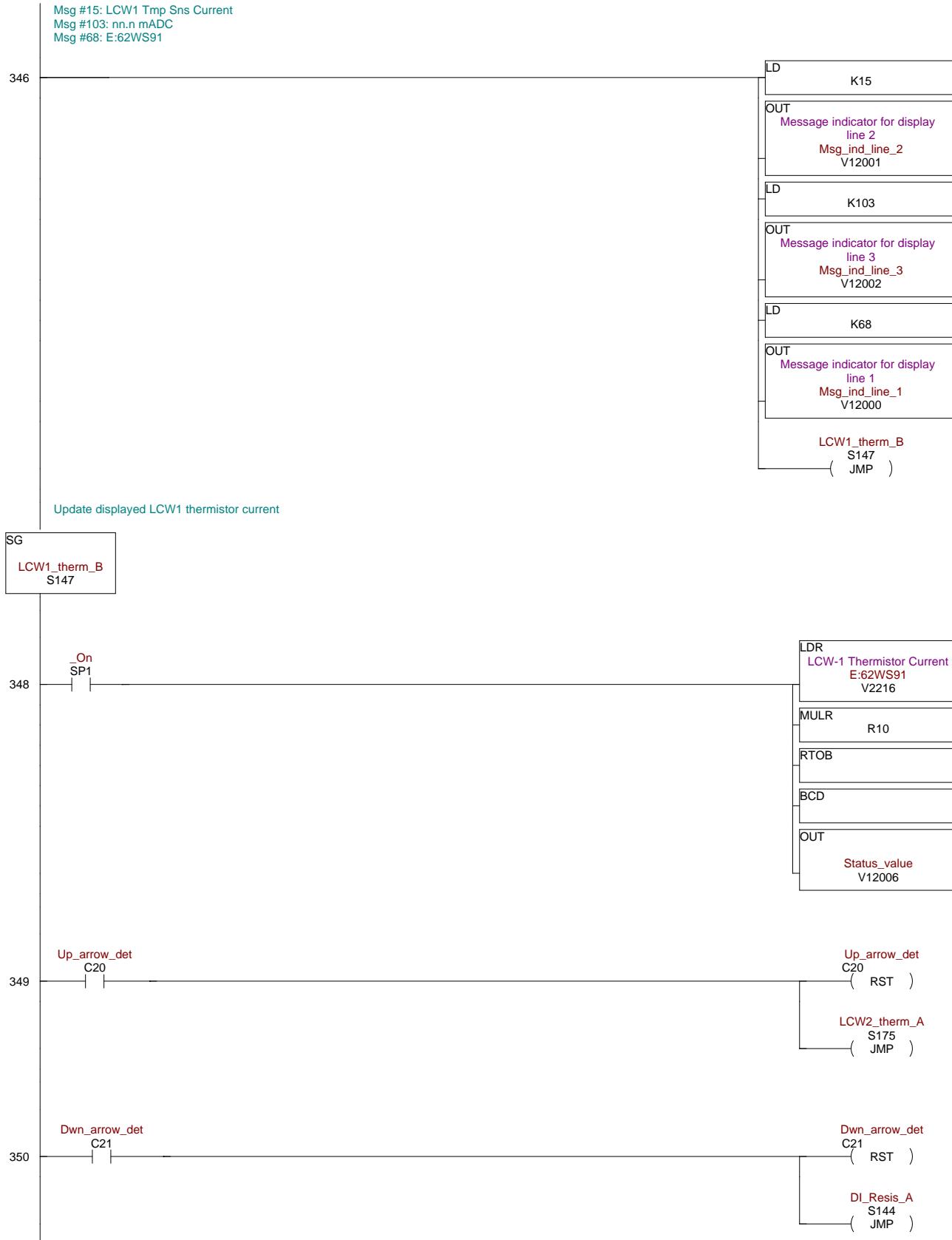


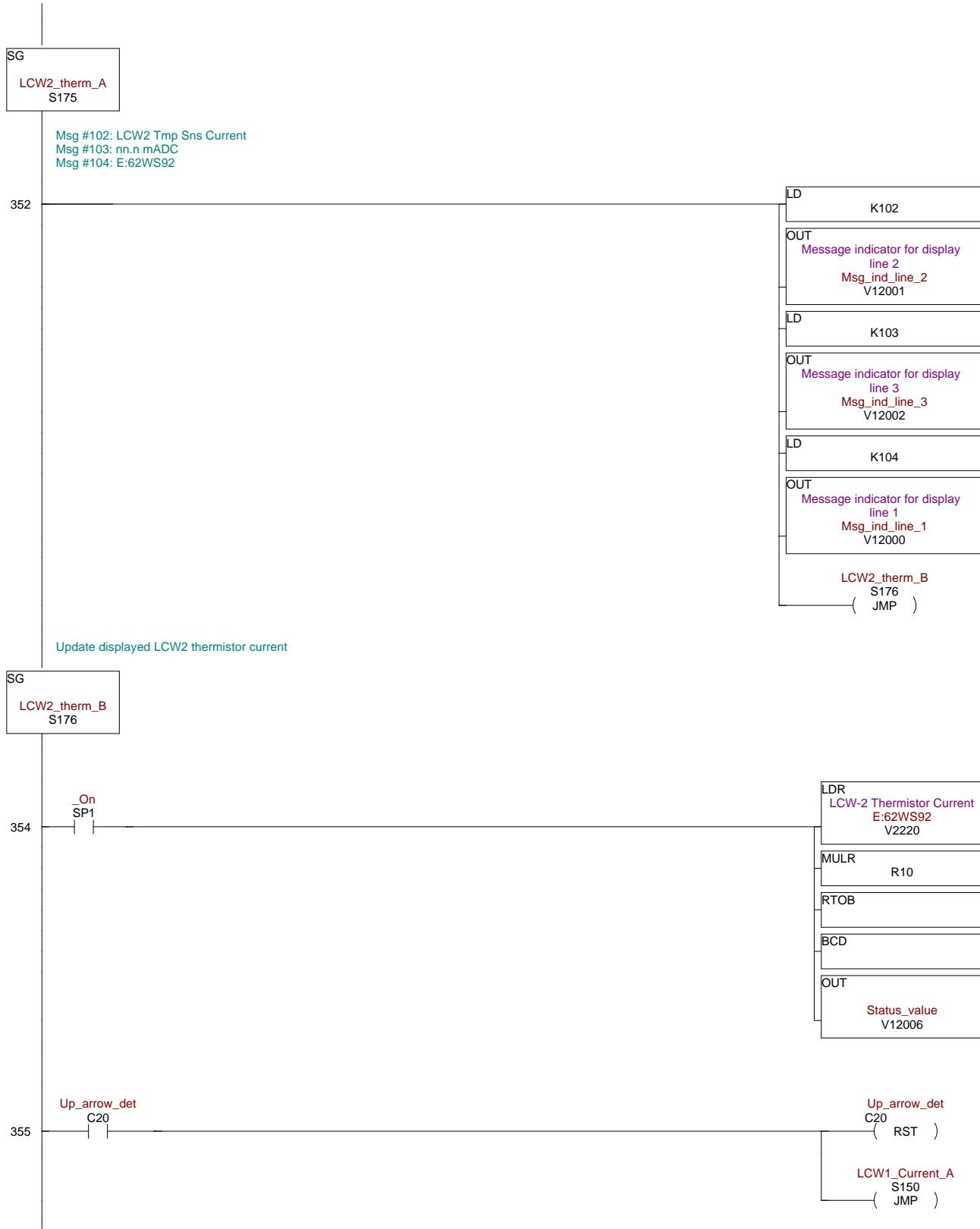


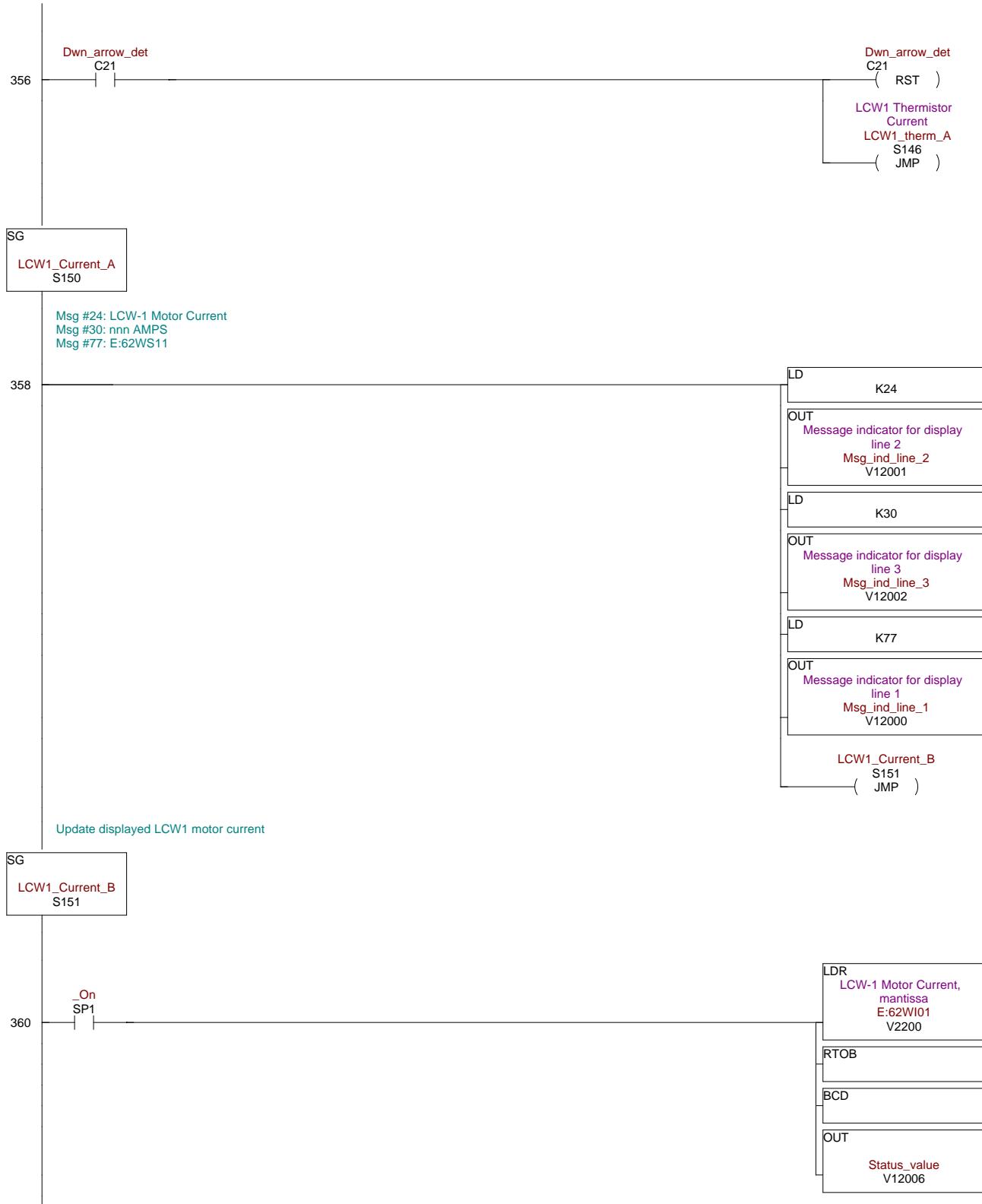


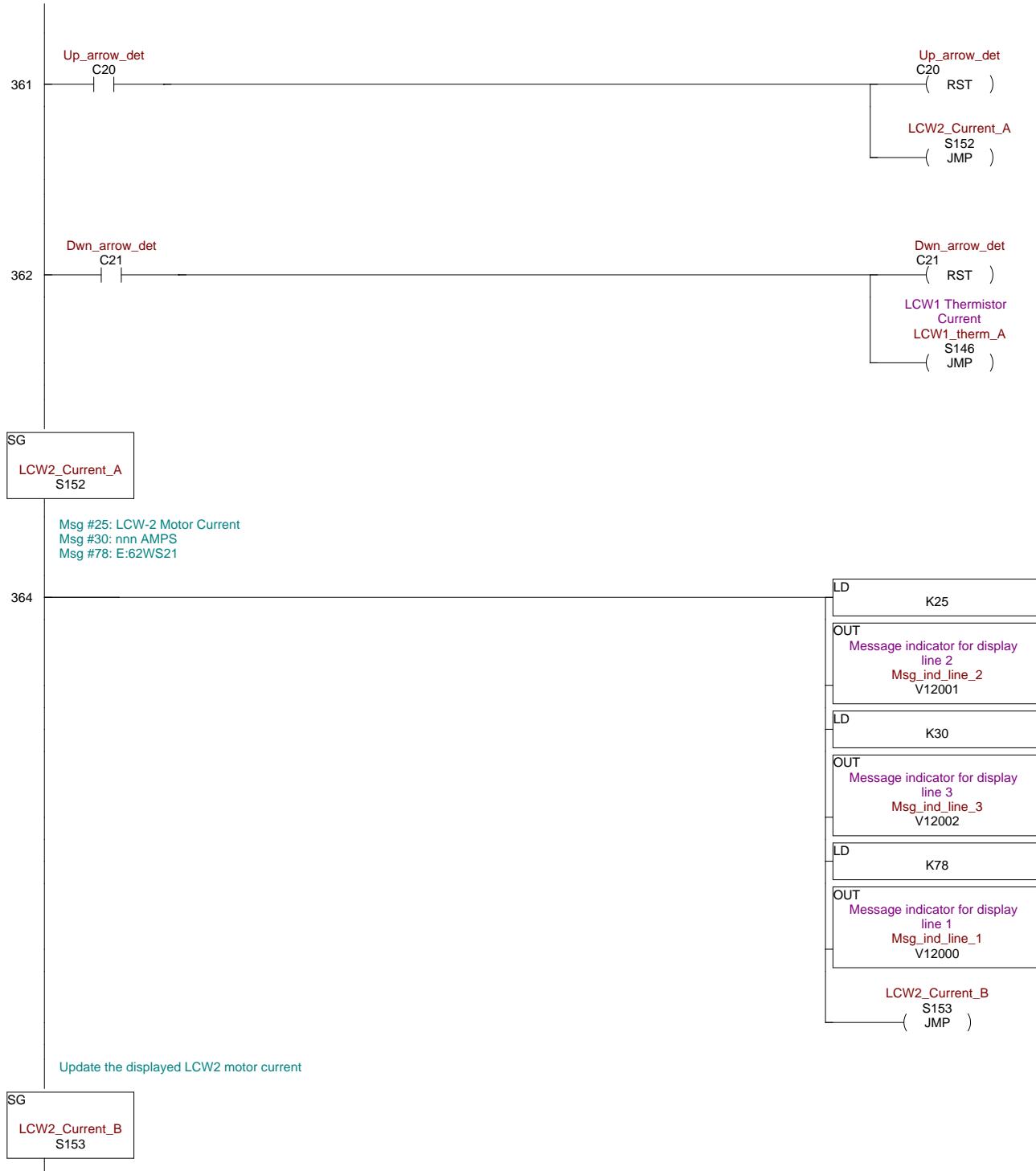


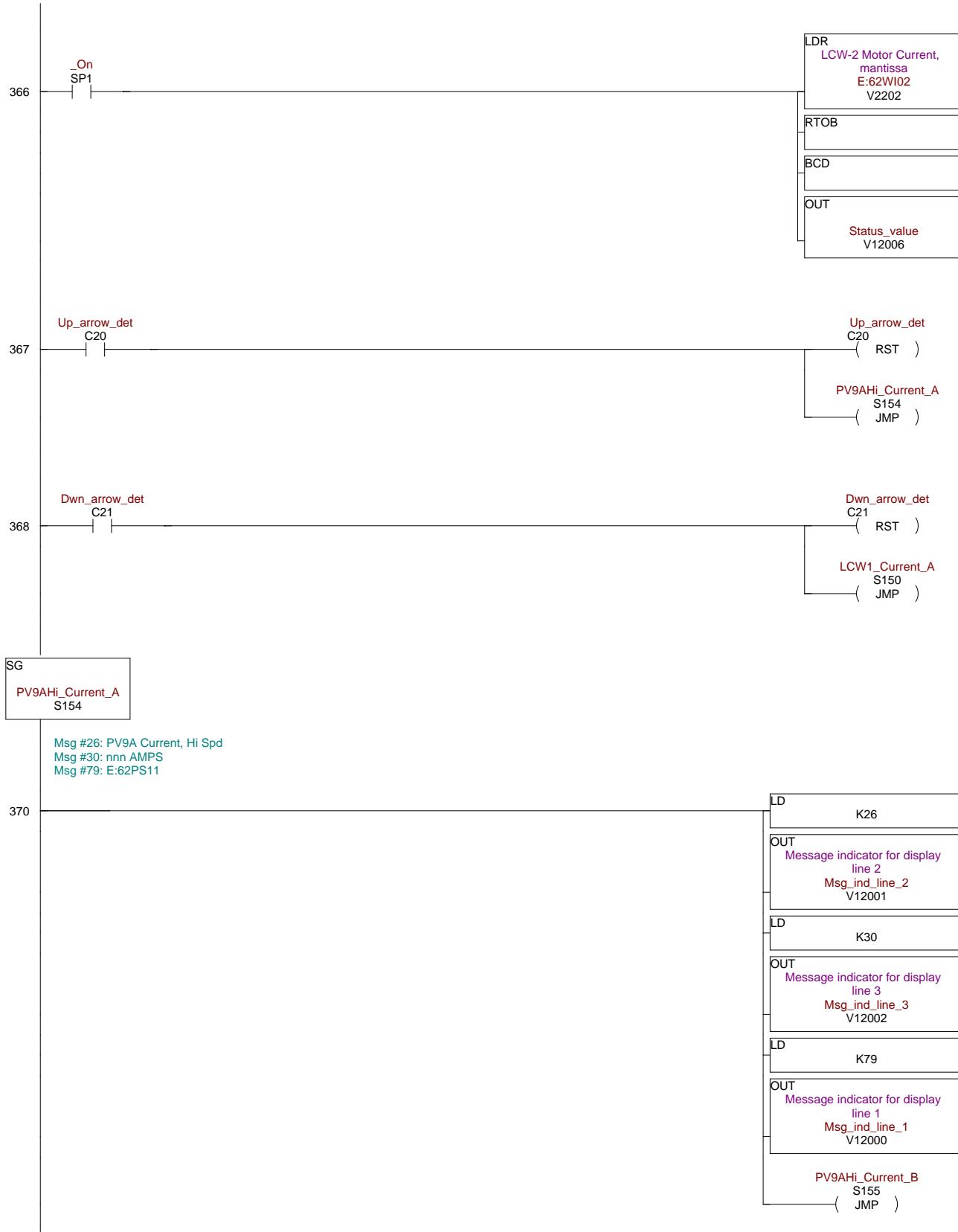


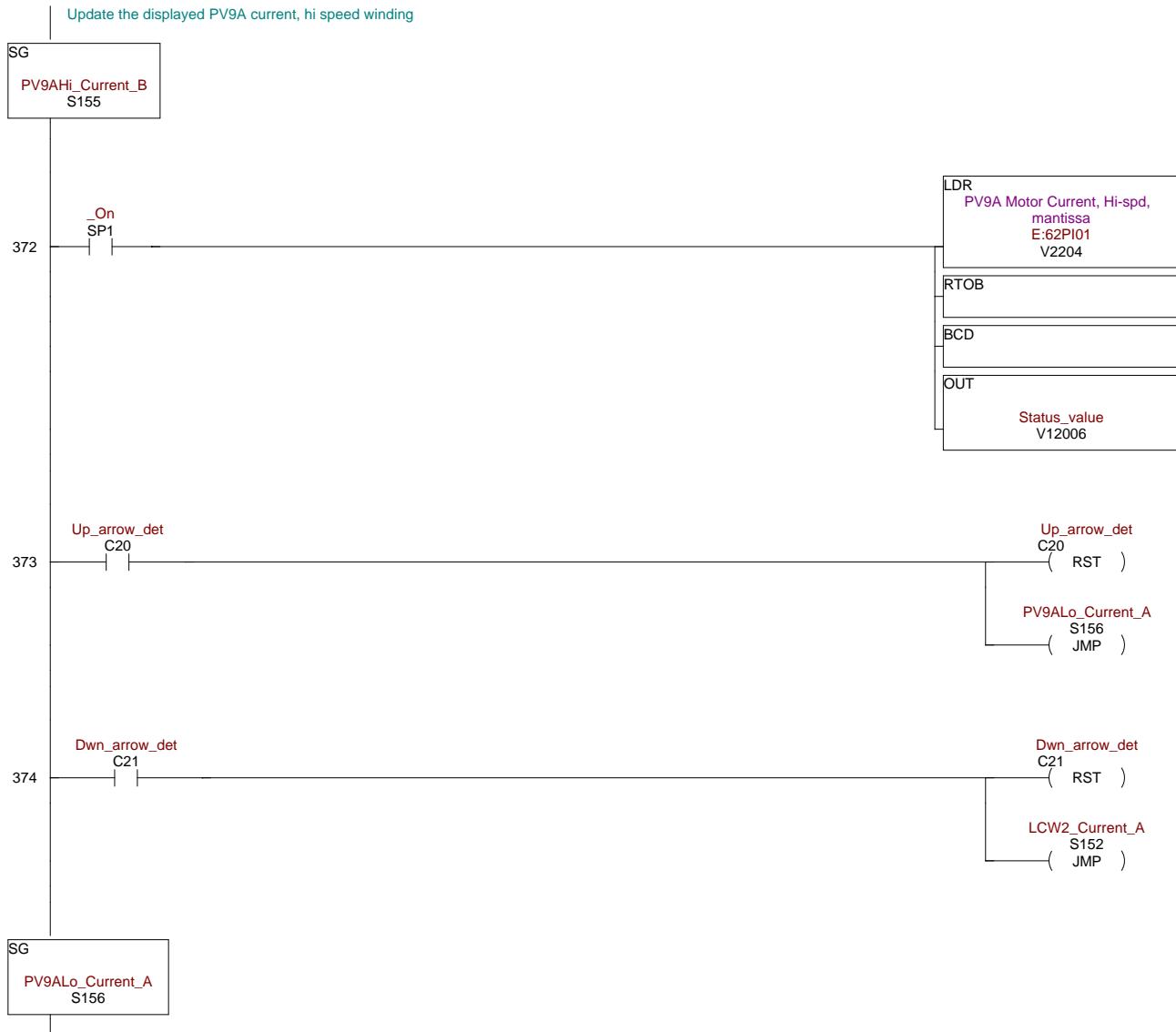


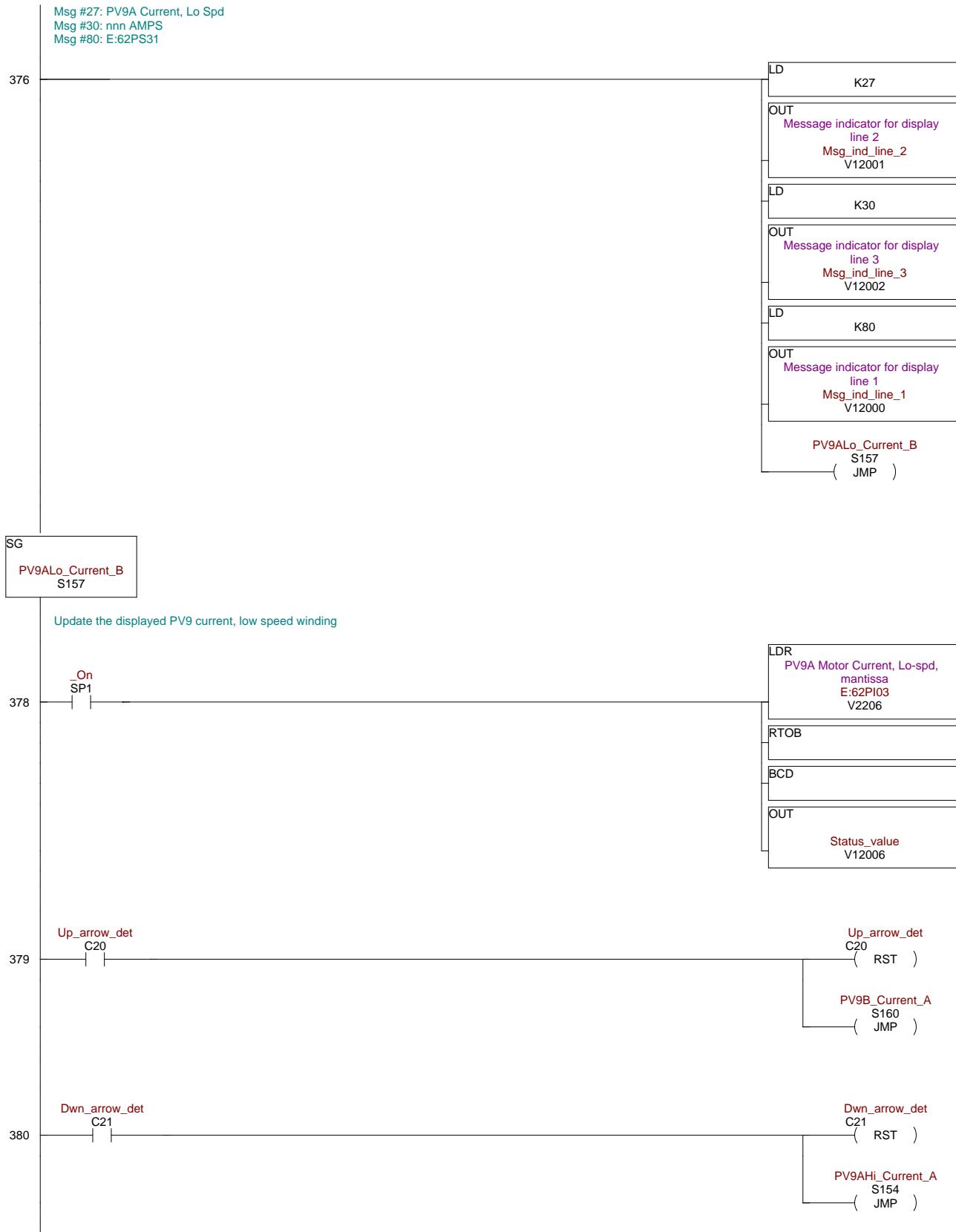


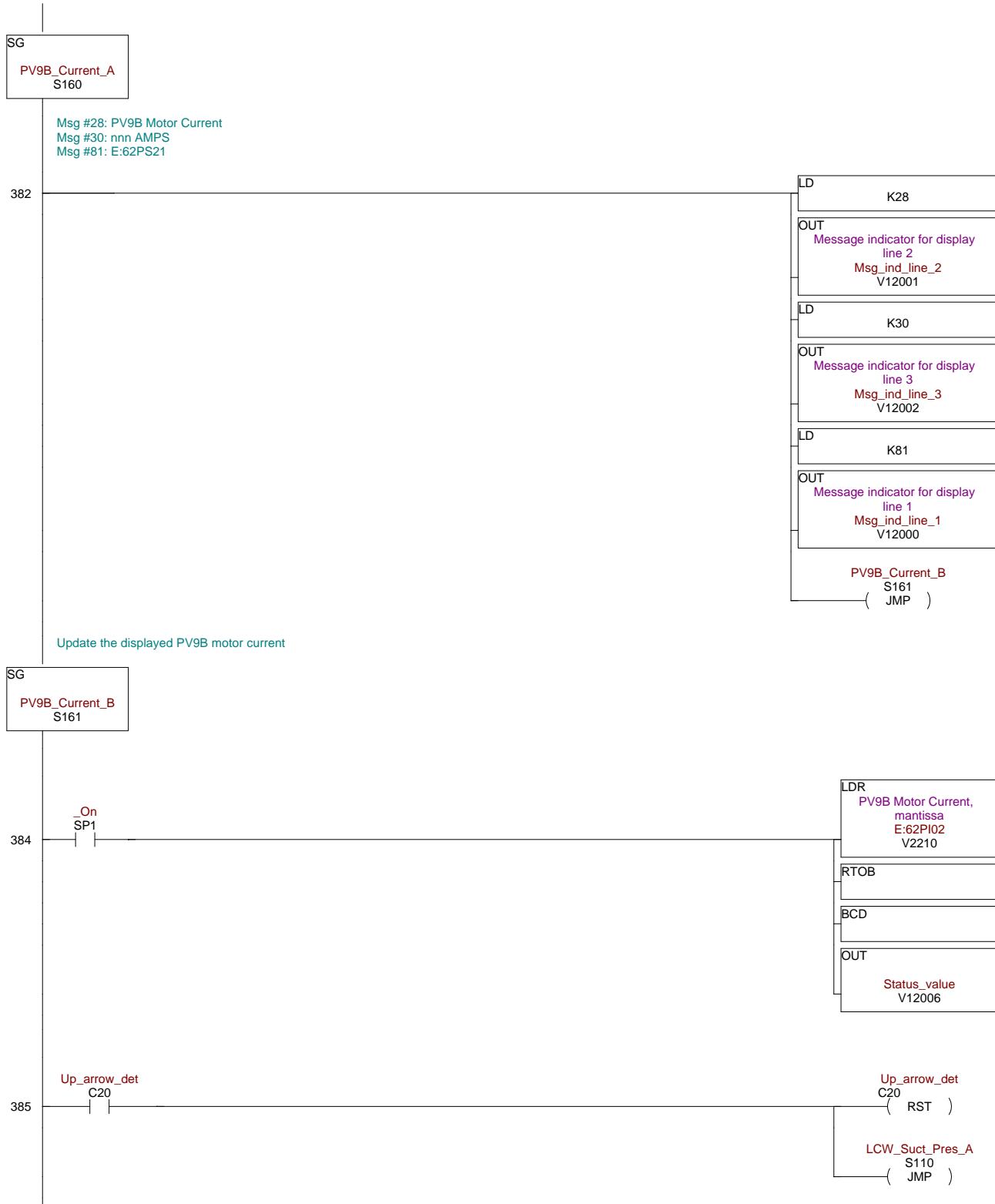


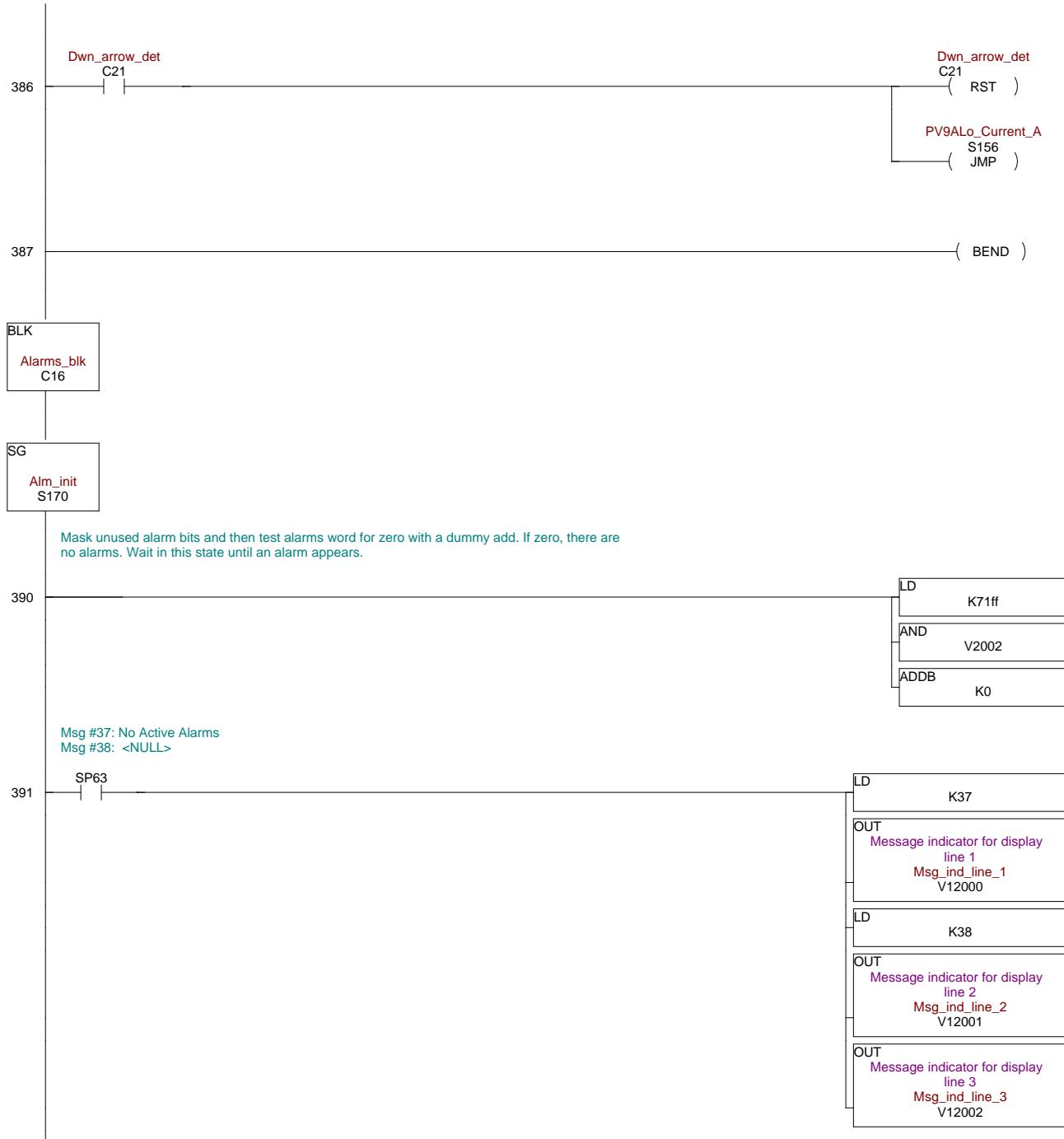


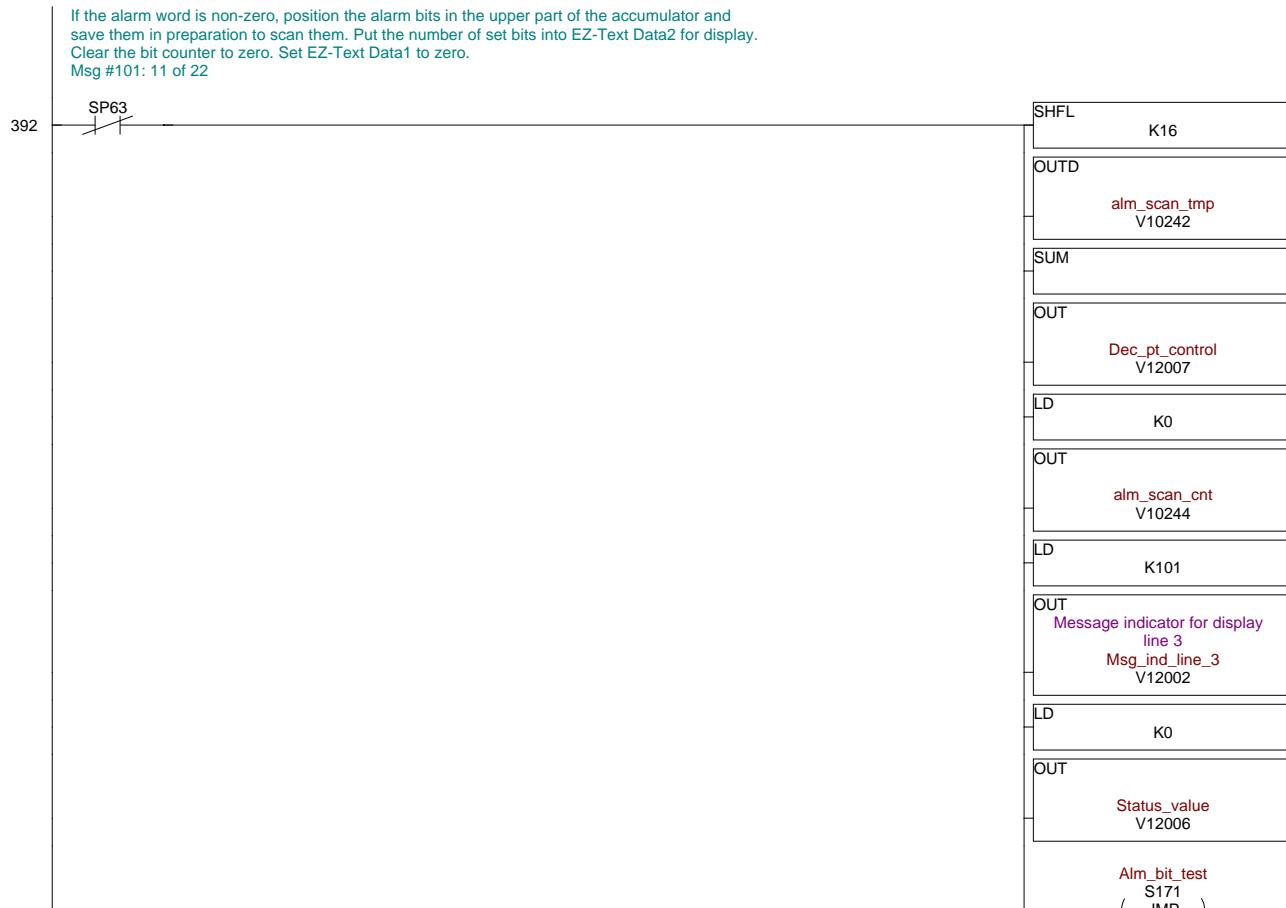




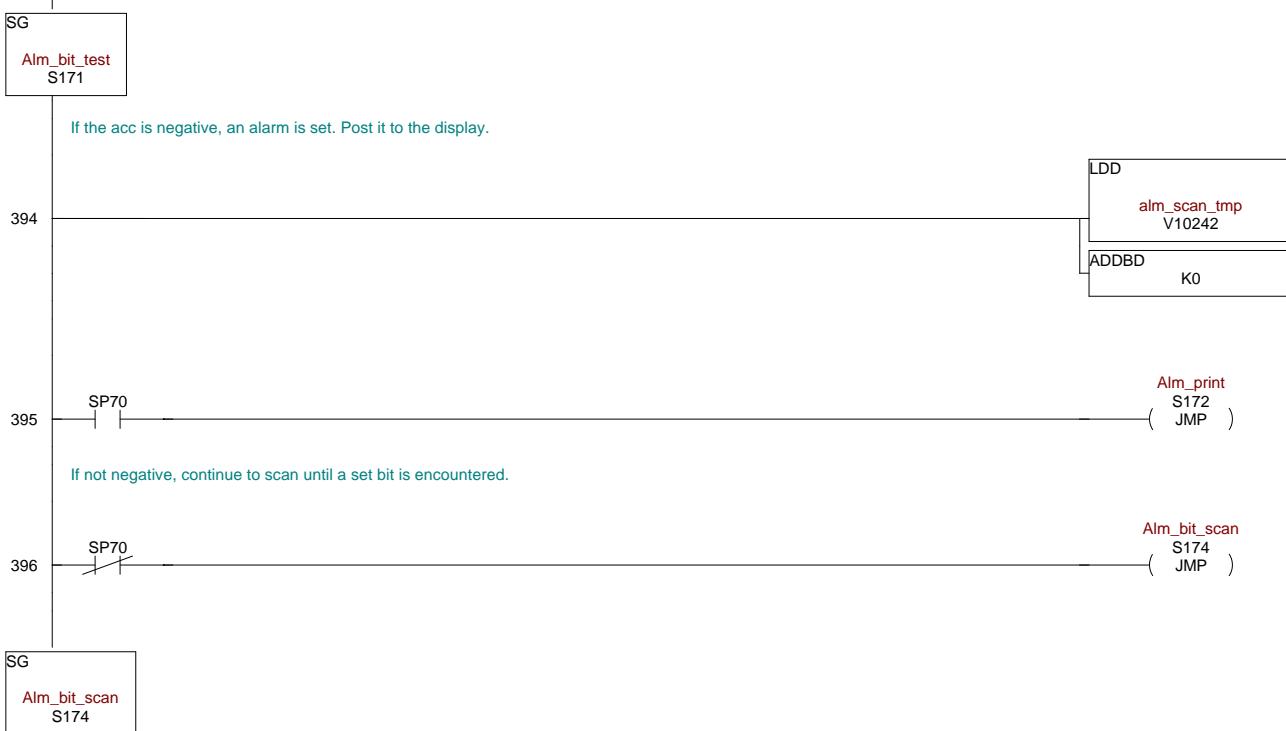








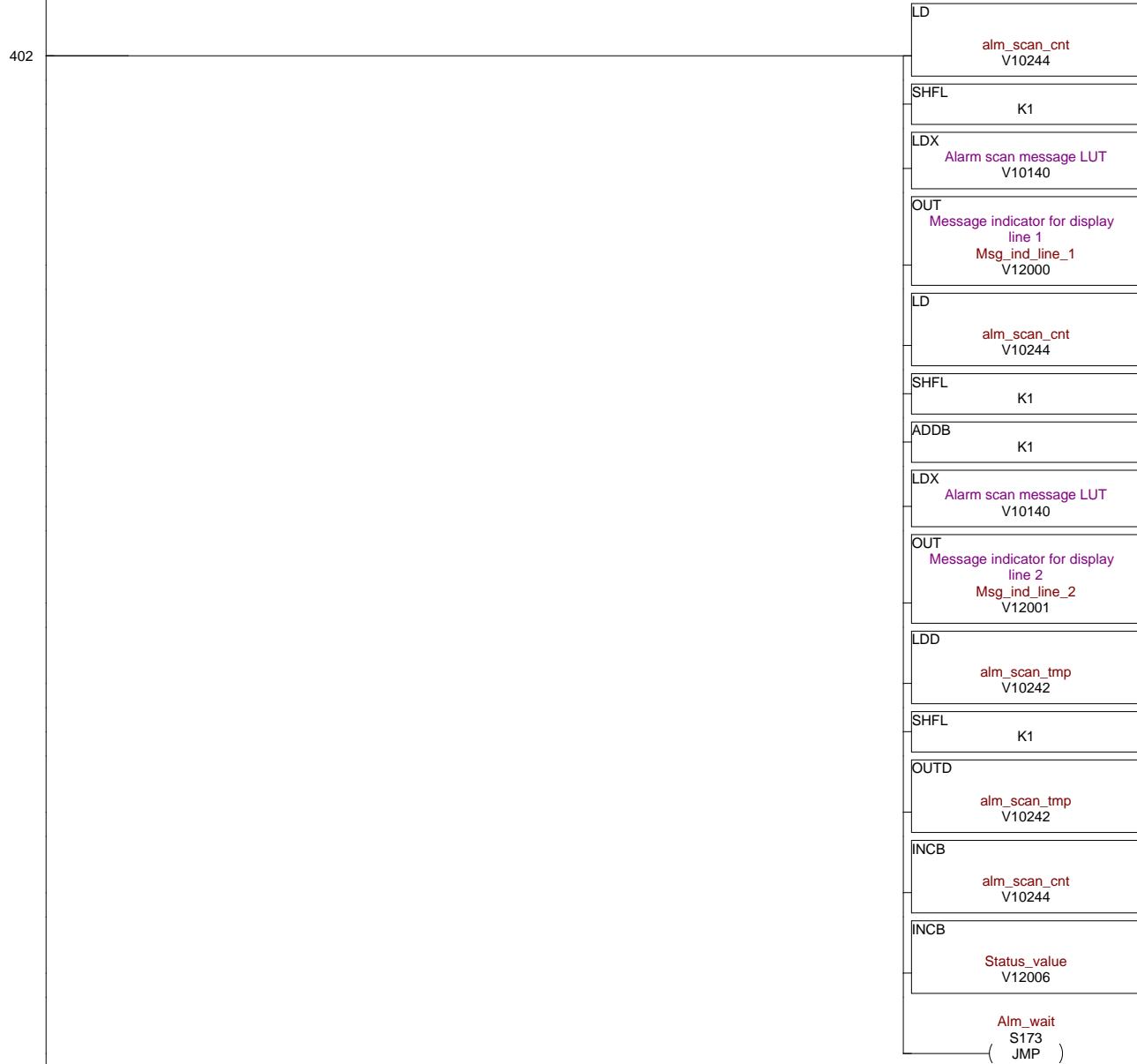
For each up-arrow press, find one alarm and post it to the display. When all alarms have been displayed, loop back to S170.



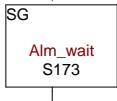


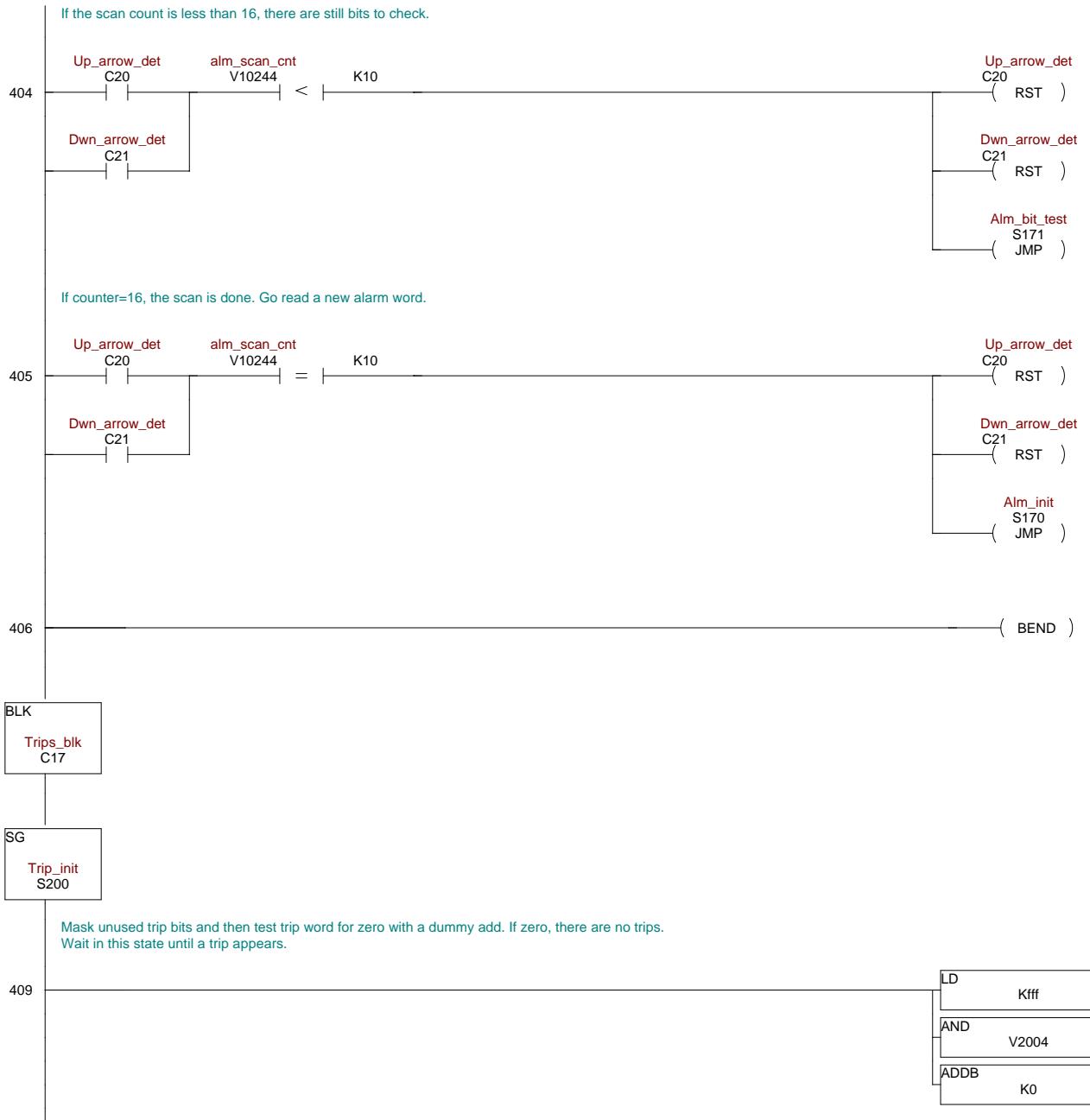
Display the ACNET tag on line 1 and a cryptic description of the alarm on line 2
 1. Multiply the current bit position by 2 to get an offset into the message table
 2. Add it to the table base address
 3. Read the message number of the ACNET tag from the table and place it into Line 1
 4. Multiply the current bit position by 2 and add 1 to get to the offset of the description message number
 5. Read the message number and place it into Line 2
 6. Shift the alarm word once and save it in preparation for the next loop
 7. Bump the bit position counter
 8. Bump the displayed alarm number count
 9. Loop

402



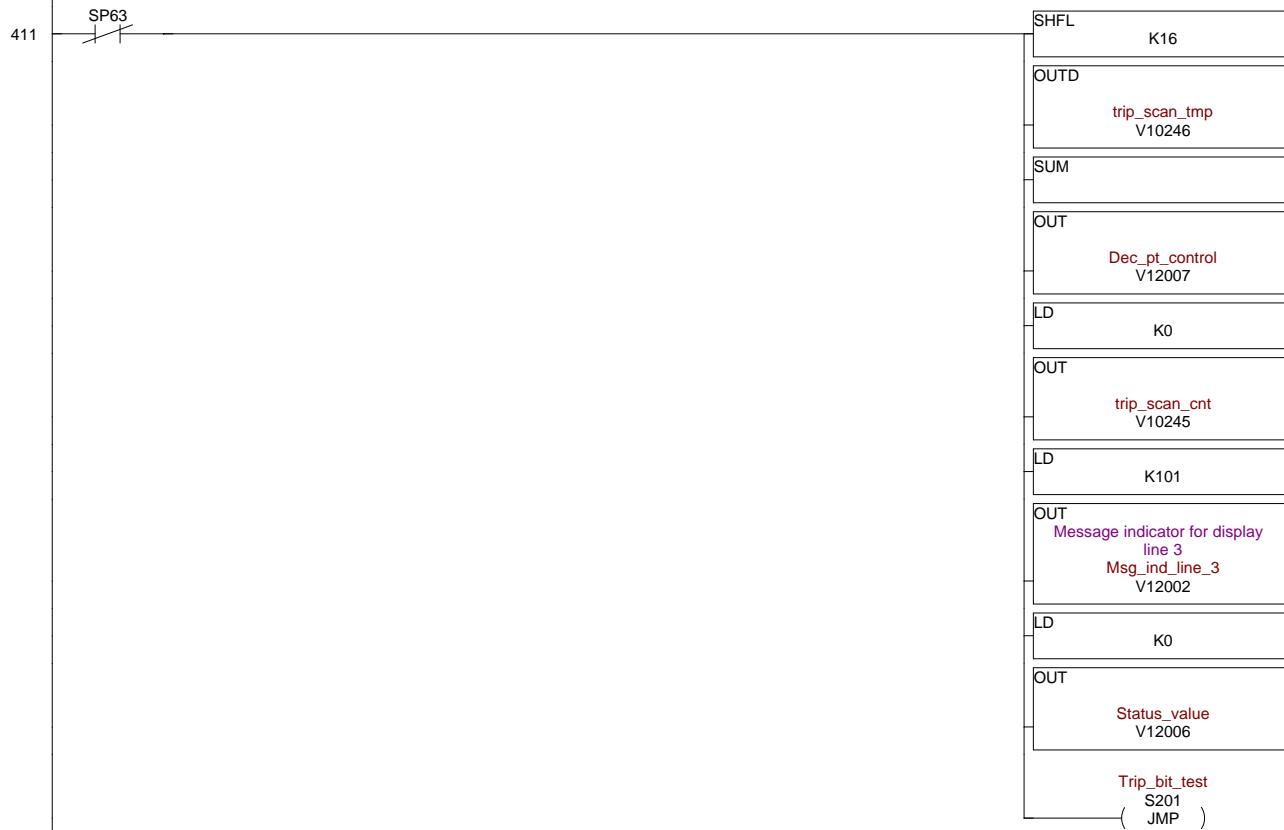
Wait for the user to press either arrow key before showing the next alarm



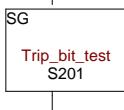


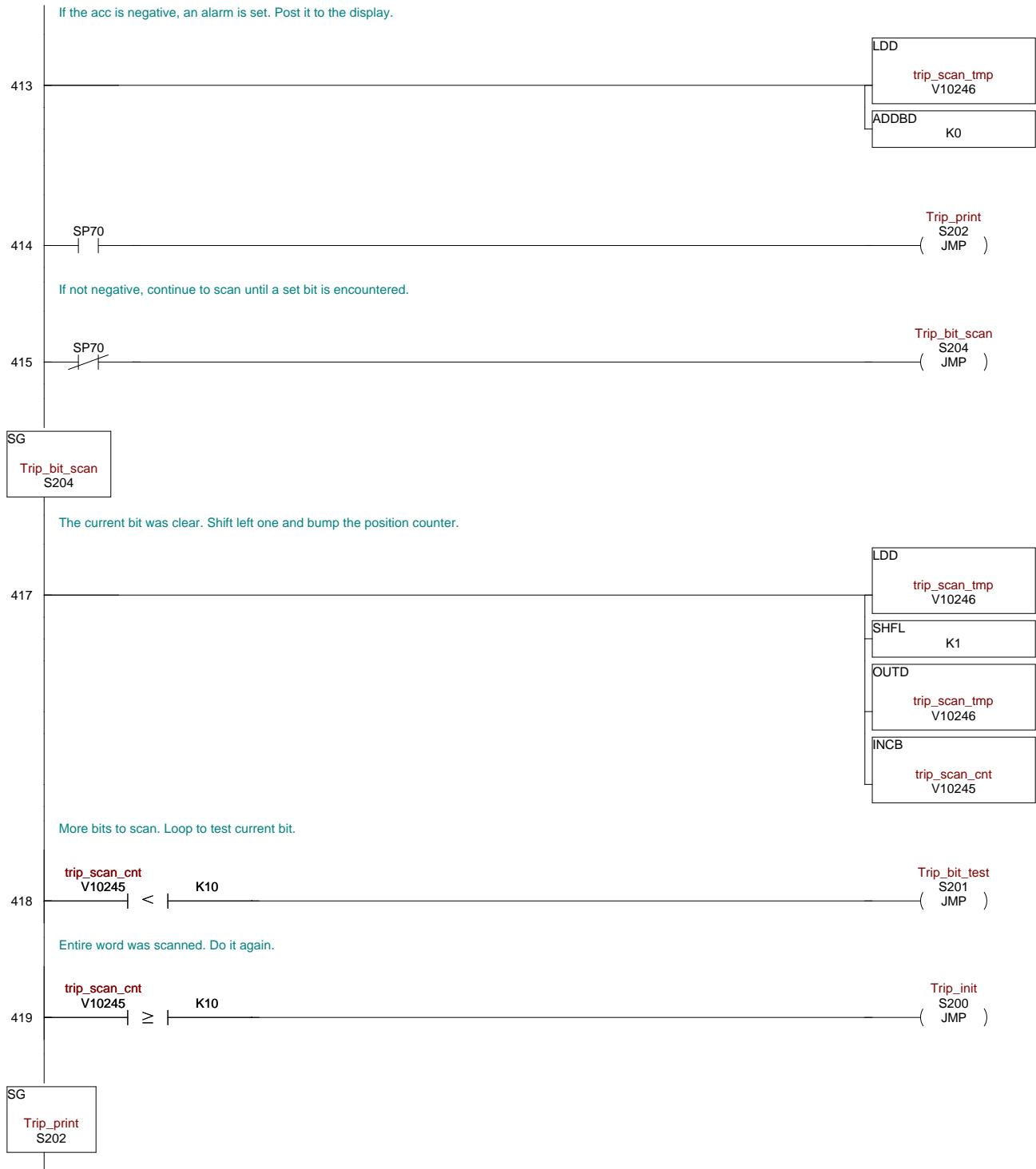


If the trip word is non-zero, position the trip bits in the upper part of the accumulator and save them in preparation to scan them. Put the number of set bits into EZ-Text Data2 for display. Clear the bit counter to zero. Set EZ-Text Data1 to zero.
Msg #101: 11 of 22



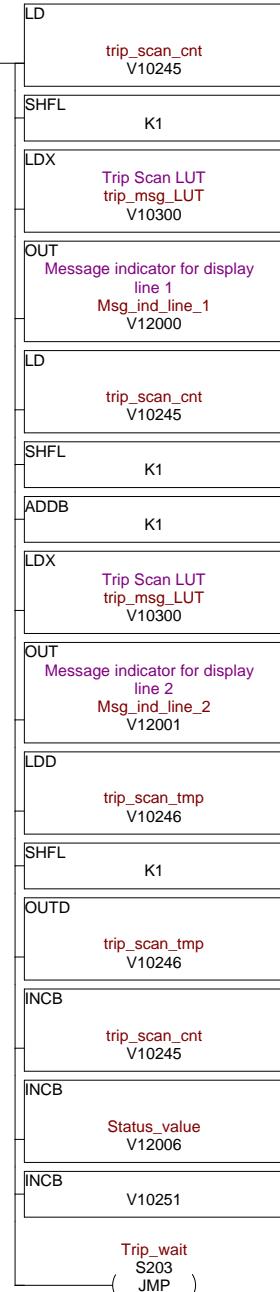
For each up-arrow press, find one trip and post it to the display. When all trips have been displayed, loop back to S200.



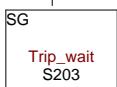


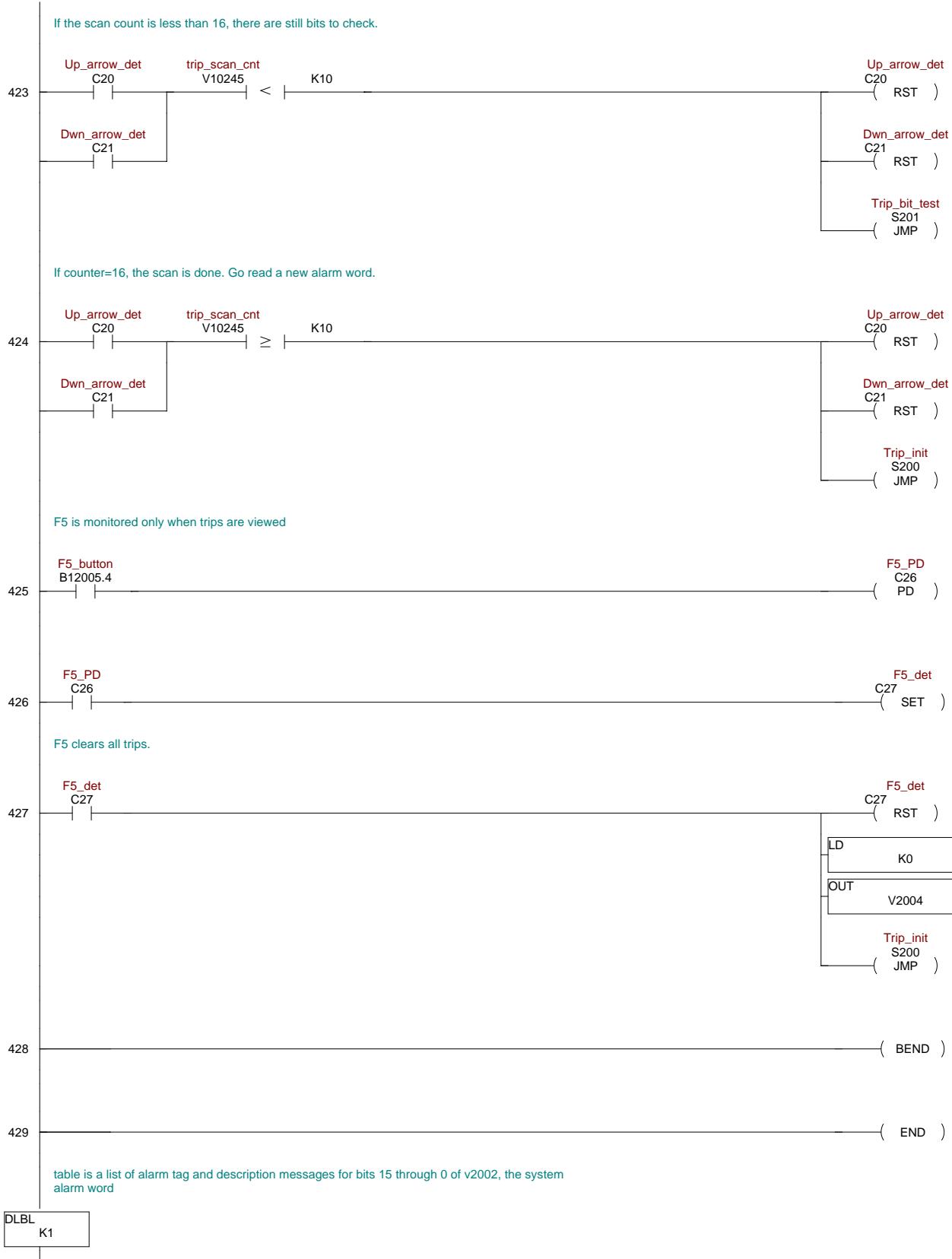
Display the ACNET tag on line 1 and a cryptic description of the trip on line 2
 1. Multiply the current bit position by 2 to get an offset into the message table
 2. Add it to the table base address
 3. Read the message number of the ACNET tag from the table and place it into Line 1
 4. Multiply the current bit position by 2 and add 1 to get to the offset of the description message number
 5. Read the message number and place it into Line 2
 6. Shift the trip word once and save it in preparation for the next loop
 7. Bump the bit position counter
 8. Bump the displayed trip number count
 9. Loop

421



Wait for the user to press either arrow key before showing the next alarm

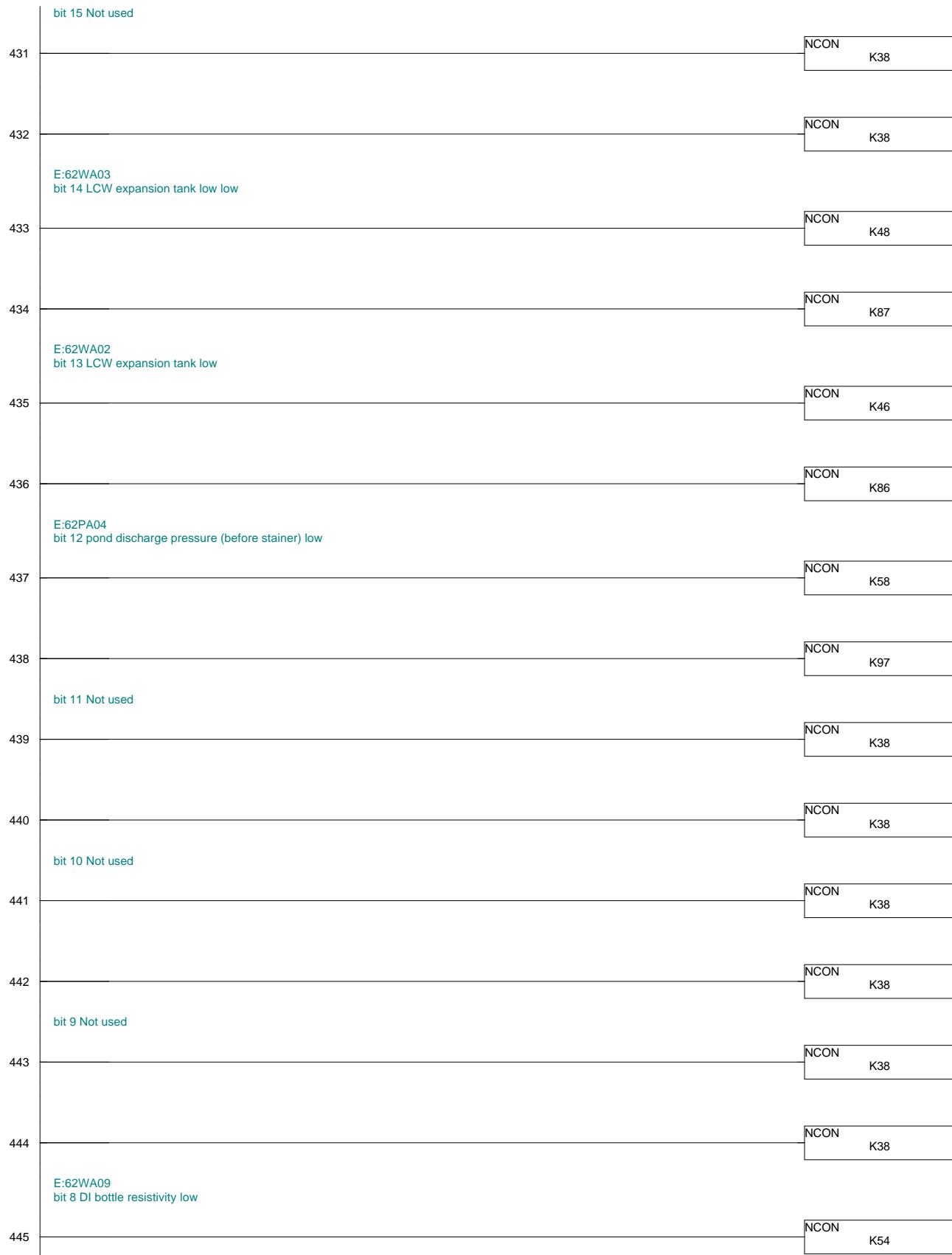




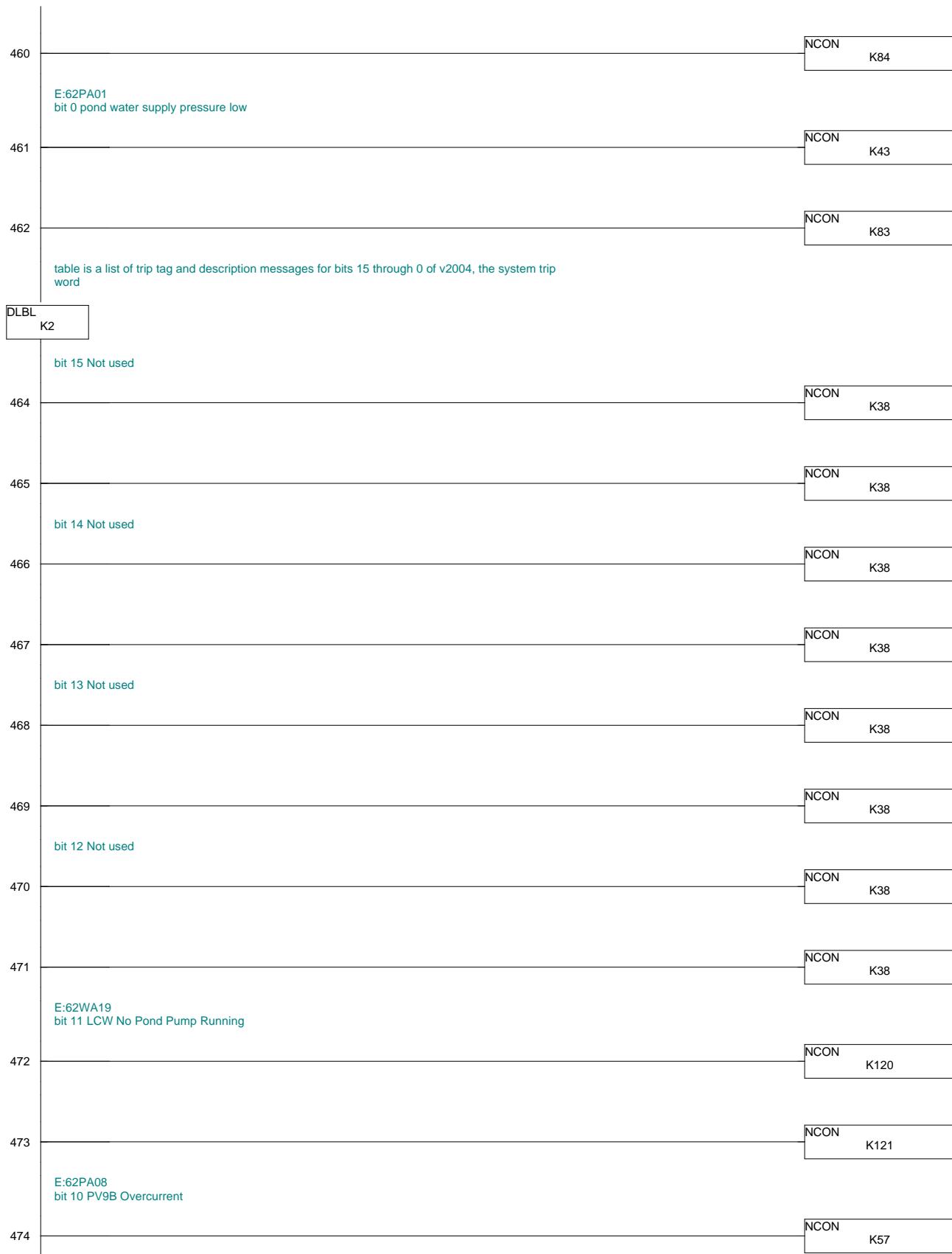
9/25/2006

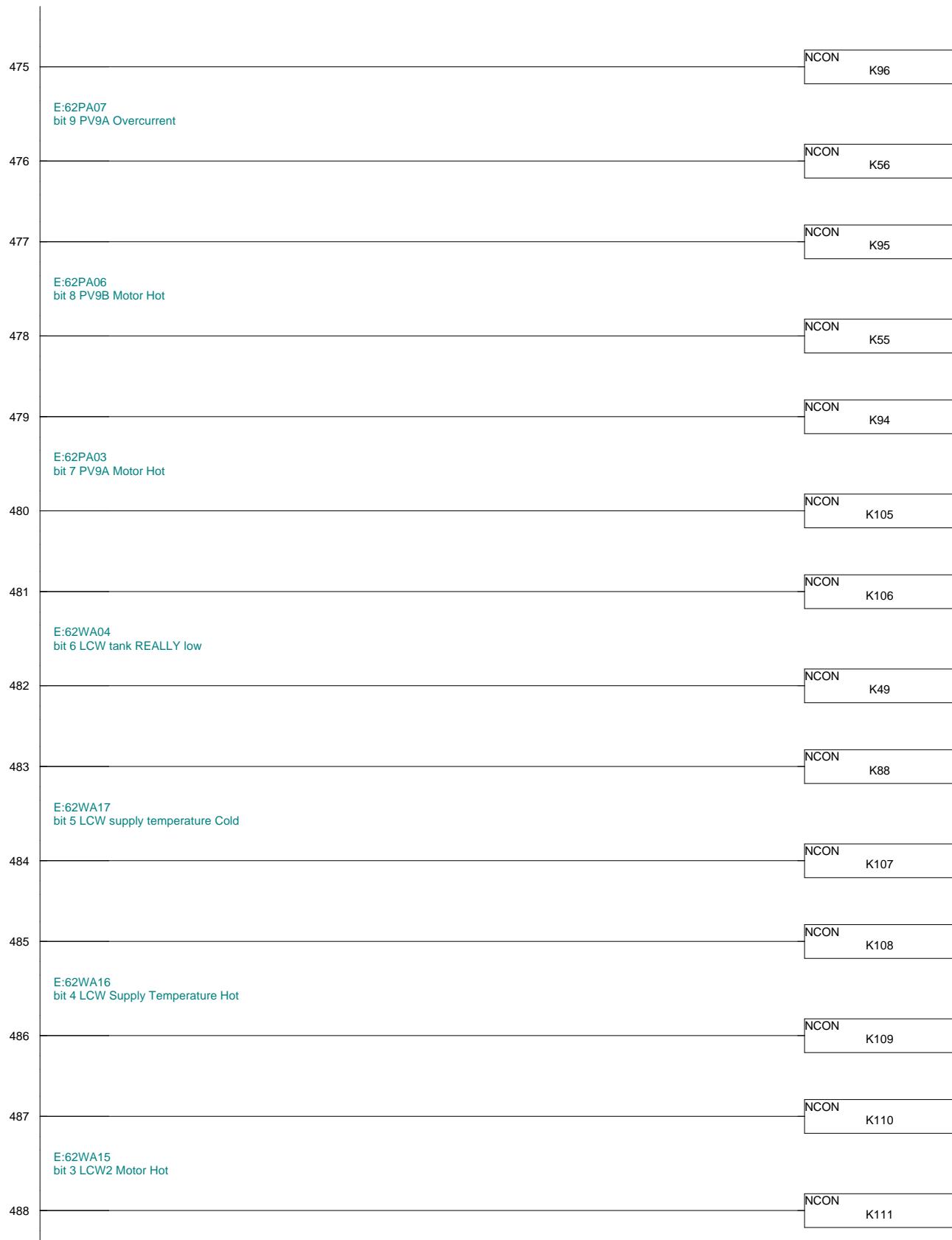
450

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450

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